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FORECASTING THE SUPPLY SIDE OF THE ECONOMY

HEARING

BEFORE THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

NINETY-SIXTH CONGRESS

SECOND SESSION

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CONTENTS

WITNESSES AND STATEMENTS

WEDNESDAY, MAY 21, 1980

	Page
Bentsen, Hon. Lloyd, chairman of the Joint Economic Committee: Opening statement	1
Brown, Hon. Clarence J., member of the Joint Economic Committee: Opening statement	2
Rivlin, Hon. Alice M., Director, Congressional Budget Office, accompanied by William J. Beeman, Assistant Director for Fiscal Analysis; and Nariman Behravesh, Econometrician	3
Eckstein, Otto, president, Data Resources, Inc., and Paul M. Warburg Professor of Economics, Harvard University, Cambridge, Mass	19
Evans, Michael K., president, Evans Economics, Inc., Washington, D.C	40
Klein, Lawrence R., chairman, board of trustees, Wharton Econometric Forecasting Associates, Inc., Philadelphia, Pa	50
Ture, Norman B., president, Norman B. Ture, Inc., Washington, D.C., and president, Institute for Research on the Economics of Taxation	57

SUBMISSIONS FOR THE RECORD

WEDNESDAY, MAY 21, 1980

Eckstein, Otto:	
Prepared statement	24
Evans, Michael K.:	
Prepared statement	43
Klein, Lawrence R.:	
Prepared statement	53
Rivlin, Hon. Alice M., et al.:	
Response to Senator Roth's questions regarding CBO's revenue projections for the next 5 years, 1981–85	14
Ture, Norman B.:	
Prepared statement	61

FORECASTING THE SUPPLY SIDE OF THE ECONOMY

WEDNESDAY, MAY 21, 1980

CONGRESS OF THE UNITED STATES,
JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The committee met, pursuant to notice, at 10 a.m., in room 6226, Dirksen Senate Office Building, Hon. Lloyd Bentsen (chairman of the committee) presiding.

Present: Senators Bentsen and Roth; and Representatives Brown, Heckler, and Rousselot.

Also present: John M. Albertine, executive director; Lloyd C. Atkinson, Paul B. Manchester, L. Douglas Lee, and Mayanne Karmin, professional staff members; Charles H. Bradford, minority counsel; Stephen J. Entin, minority professional staff member; and Betty Maddox, administrative assistant.

OPENING STATEMENT OF SENATOR BENTSEN, CHAIRMAN

Senator BENTSEN. The hearing will come to order.

Last June, just about 11 months ago, I held a press conference with the ranking minority member of this committee, Representative Brown, on the deteriorating economic situation in this country.

At that time, I said we were entering into a period of stagflation that will cost us hundreds of thousands of American jobs, while doing very little to bring down the cost of living. If the American economy is ever to get out of its boom-and-bust pattern, then we ought to embark on a new set of economic policies designed to achieve our long-term economic goals.

I stressed the theme of the Joint Economic Committee's 1979 Unified Annual Report, repeated in 1980, that economic policy must focus on the supply side of the economy, on the capacity of the economy over the long term to increase the standard of living for the average American, to create a job for every American who wants to work, and to hold down the cost of living by increasing the goods on the shelves of the Nation's businesses.

I felt very strongly then that if we continued to focus solely on demand policies, we risked a recession. Well, we are now in that recession. And now I feel equally strongly that if we continue to focus solely on demand policies, we risk the Nation's economic future.

For too long, we have focused on shortrun policies to stimulate spending or demand, while neglecting supply, labor, savings, investment, and production. Consequently, demand has been overstimulated, and supply has been strangled in a noose of disincentives, a great number of unnecessary regulations, taxation, inflation, and codes of conduct not respected by our foreign competitors.

Only recently have some computer models of the Nation's economy been adapted to take those disincentives into consideration. But we must quicken the pace if we are serious about controlling stagflation, instead of having it control us.

I am convinced that we do not have to put people out of work to control inflation. The goal of the next decade should be to fight inflation and unemployment through supply-side incentives to put more goods on the shelf. I think that is the way to cut prices and to boost employment in this country of ours.

Time and time again, when we suggest those things, I get people who react and say, in public office: Yes, but that takes too long. Now we've got to have ourselves a "quick fix" before the election. I do not see how you get there. I do not see how you accomplish the long-term objectives of the country unless you get started.

At this hearing, the committee will ask leading economists their views of what is ahead of us in the economy, how they think the Nation can best emerge from this downturn poised for noninflationary economic growth.

In the future, we can expect the debate in Congress and in the executive branch over the proper amount and type of economic stimulus to be heavily influenced by econometric models. So it is altogether proper and prudent for us to take a look this morning at what is in these models, how they are changing, and how they view the supply side of the economy.

I would like to now turn to my friend, the ranking minority member of this committee, Representative Brown, for any comment he has before we start the questioning.

Opening Statement of Representative Brown

Representative Brown. Mr. Chairman, thank you very much.

For many years, economists thought of unemployment and slow growth as short-run problems caused by inadequate spending on existing goods. Little thought was given to the possibility that the capacity to produce might become inadequate and fail to respond when demand perked up.

Even less thought was given to the long-term decline in savings, investment, productivity, and the ability to compete with foreign producers. America is paying for these mistakes now.

The Nation's problem today is not shortrun demand; it is longrun supply. Creeping regulatory paralysis, inadequate depreciation allowances, and rising marginal tax rates created by inflation are retarding the growth of savings, plant and equipment investment, and work effort. They are crippling supply. This is the source of stagnation. Couple this with excessive money growth in a vain effort to inflate stagnation away, and you have stagflation and recession. This basic stagflation problem must be dealt with or the Nation will be in trouble—worse trouble than it is already in.

Since there will inevitably be some action taken to counter the current recession, the opportunity should be used to direct any stimulus to the cure of the longrun stagnation, as well as the shortrun recession.

Each time recessions were fought in the past, the Nation has hyped demand, assuming that supply would take care of itself. The chart to the right [indicating] gives an indication of precisely that sequence. But supply has been increasingly strangled over time.

Consequently, each economic recovery has been weaker than the last—once again, I direct you to the chart—with a higher basic unemployment rate and a higher basic underlying inflation rate.

This time around, tax reduction should be preferred to spending increases. Furthermore, tax reductions should be aimed at creating incentives to save and invest, or to work harder, rather than to spend more. We need to increase the supply of savings. We need to increase the supply of plant and equipment. We need to increase the supply of skilled manpower, and we need to increase the supply of goods on the shelves—not just to increase the demand for them.

Coupled with spending restraint to free up resources for private investment, this approach will keep real output growing to counter the stagnation of real living standards in recent years. Meanwhile, monetary policy should deal with the basic inflation problem.

The Joint Economic Committee has been recommending this policy now for several years. If it had been followed, we would not be in the recession we are in today—a recession induced by the administration, by their own testimony before this committee, in order to break the inflation and get it down from 18 percent to a wonderful low now of, the new standard, of 10 percent—an unfortunate kind of surrender to the situation that I have just described.

It is gratifying to see the major economic forecasters and model builders—at least some of them—taking the supply side of the economy so seriously these days, and hopefully modifying their models in order to reflect this.

This shift in emphasis toward long-term economic growth is long past due. Perhaps now we can devise a way to emerge from this recession with a good chance for a decade of steady growth, without inflation; rather than the decade we have just been through, inflation without much growth, with increasingly high unemployment figures.

Senator BENTSEN. We are very pleased this morning to have Ms. Alice Rivlin with us, who is the Director of the Congressional Budget Office, testifying before us on some of these questions on econometric models, how they are utilized, the benefits and the limitations of them, and we would ask you now to proceed with your testimony, Ms. Rivlin.

STATEMENT OF HON. ALICE M. RIVLIN, DIRECTOR, CONGRESSIONAL BUDGET OFFICE, ACCOMPANIED BY WILLIAM J. BEEMAN, ASSISTANT DIRECTOR FOR FISCAL ANALYSIS; AND NARIMAN BEHRAVESH, ECONOMETRICIAN

Ms. RIVLIN. Thank you, Mr. Chairman.

I am delighted to be here. Let me introduce, before I proceed, my two colleagues. On my left is William Beeman, who is our assistant director for fiscal analysis. Bill's unit is responsible for our forecasts and our use of models in predicting the course of the economy for the

Congress. On my right is Nariman Behravesh, who is an econometrician and works with Bill on this effort.

Let me, before I start, also associate myself strongly with the general tone of your remarks, Mr. Chairman, and Congressman Brown's, about the importance of supply and productivity and taking a longer run look at the economy and how it can be made to grow faster. The CBO has emphasized this point very strongly in its recent reports—particularly in our January economic report entitled "Entering the 1980's: The Fiscal Policy Choices."

We have tried to begin to direct the attention of the Congress to the importance of productivity, of incentives for saving and investing, and of the longer run look. And I am delighted to be part of this set of hearings.

I welcome the opportunity to testify before this committee on the use of macroeconomic models at the CBO and on recent efforts to enhance the supply-side characteristics of these econometric models.

My statement today will cover three general topics raised in your letter of invitation: How CBO prepares its economic forecasts and analyses of alternative policies; the limitations of large econometric models; and the recent emphasis on supply and economic growth.

CBO FORECASTS AND POLICY ANALYSIS

CBO's 5-year economic projects, which are generally used by the Budget Committees in preparing their budget estimates, consist of two components. First, the 1½ to 2 years of the projection is a forecast of what will happen to the economy if current-law budget policies are continued.

Second, the remaining period is a noncyclical or trend projection reflecting goals for inflation and unemployment that are thought to be roughly realistic and roughly mutually consistent. The preparation of both types of projections relies on many sources of information, including econometric models.

CBO does not have its own econometric model of the whole economy. We currently subscribe to the commercial models provided by Chase Econometrics; Data Resources, Inc.; Wharton Econometric Forecasting Associates; and Merrill Lynch Economics, Inc. We also have access to other models on an occasional basis. In other words, I come before you today as a customer of model builders, not as one who builds models for our own use.

In preparing its economic forecasts, the CBO staff examines forecasts based on several of these models, as well as information from many other sources—such as sales or inventory data provided by private sources, surveys of business plans for investment spending from the Commerce Department and from others, manufacturers' production plans, and surveys of consumer sentiment.

We also review the forecasts of many private forecasters to determine the views of a broad range of economists. About twice a year, a preliminary version of the CBO forecast is reviewed by a panel of outside experts, including distinguished economists from across the political spectrum. Our final forecast represents our best judgment as to the economic outlook, given current-law budget assumptions, after taking into account model results, additional information, and the views of other forecasters.

In analyzing the economic impact of alternative fiscal policies—which is a slightly different operation—the CBO staff also makes use of evidence from a wide variety of econometric models and other economic research. Since the results generated by various models differ, we have developed a method for averaging the results of several large models. These estimates of the economic and budgetary impacts of fiscal policies permit CBO to provide consistent analyses of different proposals. Frequent reexamination of available models and other information insures that our impact estimates are kept up to date, in the sense that they reflect changing economic conditions and new developments introduced by the model builders.

This methodology is useful for analyzing comparatively simple changes in budget policies, such as changes in personal income tax rates and in the volume of Government purchases and transfer payments. Even for these policies, however, there is a wide band of uncertainty. For many other fiscal policy changes, the econometric models provide little help—either because the results differ widely, or because such models are not designed to analyze those proposals. The large models have not been helpful, for example, in analyzing changes in capital gains taxes, certain types of business tax changes, and tax exemptions intended to encourage savings. These are essentially too detailed to be picked up in the models the way they are constructed.

Senator BENTSEN. It is too what? Would you repeat that?

Ms. RIVLIN. Too detailed. The models are simply not constructed to reflect those changes.

In such cases, CBO must rely on other sources of information. Frequently the difficulty lies in the state-of-the-economists' art. It is an unfortunate fact that many issues of central interest to policymakers are now at the frontier of quantitative economics and may not be resolved for years.

Given the difficulty of the tasks and the limitations of the tools available, I believe that CBO's record for forecasting has been relatively good, and that our analysis of alternative policies is as objective as we can make it. But we are not complacent. We are continually trying to improve our methodology, and we follow with interest new developments introduced by econometric model builders and other research. It is for that reason that we are particularly interested in being involved in this set of hearings.

LIMITATIONS OF LARGE ECONOMETRIC MODELS

The large econometric models of the U.S. economy are basically sets of equations reflecting the relationships between major economic variables that have existed during the period since World War II. Forecasting with these models requires that numerous assumptions be made about such things as OPEC policies, farm price increases, and future monetary and fiscal policies. The forecaster must also use his judgment to modify the results in order to take into account a substantial amount of information not incorporated in the models. Thus, the accuracy of econometric model forecasts depends on the skills of the forecaster, as well as the properties of the model.

The systematic relationships among variables in econometric models are based on historical experience. That is all a model is, a systemiza-

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tion of historical experience. When proposed policies or economic events are outside the range of this experience, the value of the model simulations is doubtful. For example, the models may not be reliable in their estimates of how consumers and business will respond to inflation and interest rates when those rates are at the high levels of recent months. Because we have not had that experience before it is not reflected in the models. Nor can they be expected to provide reliable estimates of the effects of tax changes that are much larger than those of the past.

Another limitation is that each model embodies a structure that the model builder believes represents the actual economy over the historical period as closely as possible. Since each model has a somewhat different structure, the results of simulations also differ, and it is difficult to know which one is more correct.

Moreover, econometric models generally cannot be relied on to predict the outcome of proposed policies that would fundamentally change the structure of the economy. For example, by themselves, models are not very useful for studying proposals to eliminate the corporate income tax, to integrate the personal and corporate income tax, or to adopt a value-added tax. These are major changes that would change the structure, and we do not know exactly what they would do.

Still another limitation is that macroeconomic models frequently contain insufficient detail for the analysis of specific policy changes. For example, the macroeconomic effects of proposed changes in Federal regulations cannot be analyzed with these models. Here again, the forecaster must draw on other sources.

Finally, most of the large models are designed primarily for analyzing the shortrun effects of policies on output and employment. Because most of the requests we receive from the budget committees relate to these shortrun impacts, the models have been useful to CBO.

The models can capture shortrun effects on supply as well as on demand. For example, econometric models can provide useful analysis of the impact on the economy of strikes and disruptions of oil supplies. Moreover, the models are also capable of forecasting the shortrun effects of tax policies on investment.

Recently, however, there has been an increased interest in the impact of policy changes on productivity gains and longrun economic growth. With regard to these longrun issues, we have less confidence in the results of model simulations. Longrun analyses require more emphasis on conditions that affect the trend growth of potential output, particularly the supply of physical capital and human capital and technology. It is very difficult, because of data limitations, to capture longrun effects of policies in econometric models. Also, shortrun swings in the data tend to swamp longrun trend movements, so it is hard to distinguish longer run responses to policy changes.

One aspect of supply that until recently has not generally been incorporated in econometric models is the effect of marginal tax rates on both work effort and saving. These effects were excluded from the models primarily because the empirical evidence was inconclusive. It was conflicting.

Recently, model builders have attempted to enrich their models with increased emphasis on the effects of taxes on the supply of labor

and savings. This work has taken two forms; modifications of traditional large econometric models; and new supply models.

First, on modification of the traditional models: Recently DRI and Evans Econometrics have attempted to enhance the supply-side characteristics of large econometric models which traditionally have given more extensive coverage to demand conditions. You will hear more about those efforts from the model builders themselves this morning.

For example, the DRI modifications attempt to capture the effect of taxes on labor supply. The Evans model, which is not yet available for simulation, will apparently show the effect of taxes on both labor supply and savings. The DRI model shows somewhat larger effects from tax cuts than in the past. The Evans model is expected to show even larger effects, but apparently not large enough for tax cuts to pay for themselves in the first few years.

It should be kept in mind that efforts to modify traditional econometric models in this way are a fairly new development that has not been subjected to scrutiny by the economics profession generally. CBO expects to review the results of such modifications and update our analysis of policy impacts accordingly.

Second, regarding the new supply-side models: There are ongoing attempts to construct new models to isolate supply effects. Two models that have come to our attention are those developed by Norman Ture and Arthur Laffer. While work on supply models is still in the early stages of development, they may in time provide important insights about the longrun effects of taxes on economic activity and other aspects.

At present, these models do not address the problem of the shortrun effects that the CBO is asked to examine by the budget committees. They are full-employment equilibrium models, applicable only to a hypothetical full-employment economy in which increases in the unemployment rate are assumed to be voluntary.

Thus, these supply models generally exclude economic conditions characteristic of the business cycle, such as increases in the unemployment rate resulting from weak demand, or accelerating inflation resulting from excess demand. Such conditions are important in analyzing shortrun effects. Moreover, these models assume either that budget policies have no impact on inflation—which is the assumption of the Laffer model; or that they affect prices only by bringing about increases in supply—which, as we understand it, is the assumption of the Ture model.

The shortcomings of econometric models with respect to the analysis of economic growth are a serious limitation, because the longrun effects of changes in policy on productivity and inflation may be more important than shortrun effects on the level of economic activity. At present, CBO does not have much confidence in the ability of econometric models to estimate longrun effects of fiscal policy changes. Thus, our analysis of the impact of budget policies on economic growth has generally had to be qualitative, relying heavily on the economic literature in this field rather than on econometric models. Perhaps the inclusion of additional supply-side effects in large econometric models and the development of new supply-side models will eventually improve the state of the art in longer run analysis.

THE RECENT EMPHASIS ON SUPPLY AND ECONOMIC GROWTH

In recent years, there has been considerable controversy about the analysis of the shortrun impact of fiscal policy changes. Economists have disagreed about the size of tax multipliers, about whether tax changes or spending changes have larger shortrun economic efforts, and about the importance of initial conditions in determining the impact of policy changes.

Available empirical evidence does not now support the view that tax cuts have very large shortrun effects. But to focus the debate on shortrun effects is to misplace the emphasis. CBO believes that emphasis needs to be placed more on the objectives of supply-side measures, particularly on productivity, economic growth, and price stability. The recent decline in productivity growth, together with the acceleration of inflation, have heightened this concern. Surely the longrun growth of our economy must now be a major consideration, in shaping budget policy.

The unfortunate emphasis on large, shortrun efforts of supply-side policies should not be used to discredit this increased concern for productivity and economic growth. We are all agreed that there must be some income tax rate so high that it will severely discourage work effort and saving.

Whether we have reached such a tax rate in the United States is an empirical question that is not easily resolved. But while it may be difficult to test the proposition empirically, there is considerable commonsense and theoretical appeal in the view that the cumulative effects of high marginal tax rates could be quite large over a long period—say 10 or more years.

This type of supply-side effect may be an important determinant of longrun growth. More importantly, the older emphasis in supply economics—particularly the impact of business taxes on capital formation and on research and development—provides considerable support for the view that taxes are an important determinant of productivity and longrun growth.

Supply-side tax cuts are important tools for helping to achieve our longer run objectives. They are not, however, an instant cure for inflation. Moreover, the evidence available so far does not support the contention that such tax cuts will pay for themselves during the first years.

In conclusion, Mr. Chairman, at present I know of no instant cure for the trend in our economy toward weak growth in productivity and higher rates of inflation. These problems reflect an underlying weakness in our system that does not respond quickly to monetary and fiscal policy changes. As a result, the cure is likely to be painful.

In the short run, a difficult period of slack demand may be needed to prevent further acceleration of inflation. Increased economic growth will require policies that divert resources from current consumption to business investment. But it is important to begin now to emphasize the longrun effects of current action, to begin the long road to improving the performance of the economy.

The recent emphasis on supply-side issues and the related model developments will contribute to economic policymaking if it results in greater attention to the longer run effects of changes in fiscal policy.

Thank you, Mr. Chairman.

Senator BENTSEN. Thank you, Ms. Rivlin.

We have several witnesses, and important witnesses, this morning who will present differing views, and I am sure the committee will want to question each of them at length. I would suggest that we limit our questions to 5 minutes, but rotate again if there are those who want to ask on the second round.

Ms. Rivlin, I am very pleased to see you say that you are working now to try to alert the Congress to the importance of productivity on the supply side. We share that view very strongly, as you know, which our last two annual reports have demonstrated; and we feel, had we not been waging that kind of campaign, that we would have not seen the budget resolution on the Senate side that we now have, with my amendment that states that half the tax cuts would have to be devoted to productivity.

I also would say that I do not think anyone on this committee thinks that tax cuts on the supply side give an instant cure for inflation; we know that it takes a long time.

What we are saying is what I think you have said, too: that it is a comprehensive approach we need. We need some constraints in Government spending, but we also need some tax cuts that will increase productivity and many other things. There are many facets to the problem of inflation, unfortunately.

Now one point you made that disturbs me somewhat is the idea that these tax cuts must be tied to the Laffer curve, that is the idea that they have to pay for themselves. I do not think that is necessarily the case. I think there are many other things accomplished over the long run. Frankly, I do not think that they immediately pay for themselves, either. It takes some time to bring that about.

I would like to ask you, you are talking about reviewing the new supply-side models. When do you anticipate having that done? And will you be issuing a formal report on the result of that survey?

Ms. RIVLIN. We find ourselves in the middle of a very fast moving situation. We have examined in some detail the Laffer-Ranson model, which was the only one available to us a few months ago. We expect to write a report on that and to invite a group of economists to comment on the model and on our analysis of it in some forum—whether a conference or whatever. That should be possible within the next few months.

We have been talking with Michael Evans. He has graciously given us the pieces of his model as they become available. It is not fully finished, as I am sure he will tell you this morning, and it would hardly be fair for us to analyze it before it was finished. But when that model is complete and ready for operation, we are very eager to see how it works.

Senator BENTSEN. Ms. Rivlin, would you review your most recent forecast on inflation and unemployment—briefly review it for me?

Ms. RIVLIN. Yes. Our most recent forecast was done in March as a basis for the Budget Committees' moving ahead to mark up the budget resolution. We will do another forecast in July. I emphasize the dates only to say that this is May and our forecast may be a little bit out of date.

Senator BENTSEN. Well, review for me what you did in March.

Ms. RIVLIN. Our March forecast predicts a mild recession in the current calendar year. We expected that unemployment rates would rise

from what was then about 6.2 percent to about 7.3 by the end of the calendar year. They have indeed moved up faster than we anticipated, but we have not yet revised the forecast.

Senator BENTSEN. On the inflation side, what is it?

Ms. RIVLIN. On the inflation side, we forecast that inflation would come down somewhat by the end of the year, and average around 12 percent from the fourth quarter of 1979 to the fourth quarter of 1980.

Senator BENTSEN. Do you feel like updating it at this point? Or do you want to wait until July?

Ms. RIVLIN. No, I do not think we should update our forecast at this point. We will have that difficult problem soon enough, in about a month, because the Budget Committees will want a new forecast no later than July as they take a look at the second resolution.

Unfortunately, the economy is in a great state of change at the moment, and I think it is going to be particularly difficult to make that forecast.

Senator BENTSEN. You talked about difficulties in resolving the empirical question of whether current income tax rates severely discourage the work effort and savings. What is your best guess? What do you think? What is the currently available evidence?

My time has expired, but yours has not. [Laughter.]

Ms. RIVLIN. I do not think there is very good evidence on this point, on what current income tax rates do to work effort. In principle, you could imagine that the evidence would come out either way. If the tax rate of somebody who is working were cut substantially, he might say: "Aha, this is terrific; it's like an increase in my wage; it makes it more worthwhile to work, and therefore I will take on an extra job, or I will work longer hours because I get more benefit from it." One can imagine that.

One also can imagine a cut in tax rates having the opposite effect. Someone might say: "Aha, my tax rate is cut; my income is now higher; I have a higher standard of living for the same effort; I don't have to work so hard."

A priori, therefore, it is very hard to see how it would come out.

The empirical evidence would indicate that, for most full-time primary earners, it does not make a lot of difference. That is kind of "commonsense." I mean people work the workweek——

Senator BENTSEN. You say it does not make a lot of difference?

Ms. RIVLIN. It does not make a lot of difference. The people who are normal, full-time wage earners do not have a lot of control over their hours of work. They work what the factory shift is, or what the office does.

Representative BROWN. They work full time?

Senator BENTSEN. I would really like to get into that question, but I cannot because of my time limitation.

Ms. RIVLIN. Let me finish the sentence, if I may?

Senator BENTSEN. All right.

Ms. RIVLIN. The evidence is that changes in tax rates do not make a lot of difference for "primary earners." They do make a difference for secondary earners, for people who move in and out of the labor force. These tend to be teenagers and married women, who may well increase their work effort if tax rates are not so high. I think that roughly summarizes the evidence. That for the labor force as a whole, the effect

is likely to be small; but for some groups in the labor force, there will be increased work effort if tax rates are lower.

Senator BENTSEN. Oh, I wish I had more time.

Congressman Brown.

Representative BROWN. Mr. Chairman, I usually do not wish you had more time, but I do in this instance. [Laughter.] Because I think you were pretty close after the rabbit.

Ms. Rivlin, do your models assume that all Federal expenditures are the same? That the impact of them on the economy in general is the same?

Ms. RIVLIN. No, the models differ; but in general, they distinguish between "purchases" and "transfers," at least.

Representative BROWN. Would you explain that to me? "Purchases" by the Federal Government of what?

Ms. RIVLIN. Tanks, guns, aircraft carriers, and things like that—procurement.

Representative BROWN. Well, let me ask you specifically, would you assume that, say, the construction of a lock and dam system to enhance river barge traffic would be the same as, say, increased unemployment compensation?

Ms. RIVLIN. No. That illustrates the distinction between "purchase" and a "transfer"—unemployment compensation is a transfer payment. The models generally distinguish between the purchases and the transfers. But they are not very detailed. This would perhaps be a better question for the model builders who will be on the panel.

Representative BROWN. Well, I am trying to figure out what the impact of the models you are using has been with reference to results. Because, for instance, you mentioned "guns and tanks," and the creation of a lock and dam, or a highway system, and it seems to me that those are two purchases that would have distinctly different impacts.

Ms. RIVLIN. Yes. And the models we are talking about today are not specific enough to distinguish between very particular kinds of purchases.

Representative BROWN. Let me, before you go any further, say I am impressed by your testimony and impressed by that response. I am aware, however, that in the past few weeks there have been some press reports covering a controversy between Senator Muskie and Senator Hatch on the Budget Committee that give a somewhat different view or impression of your views that were drawn from some internal memos within the Budget Committee.

Ms. RIVLIN. I cannot be responsible for people misquoting me.

Representative BROWN. But I gather that those memos and those opinions were not what you are sharing with us today; that it is an incorrect impression; that you are anxious to try to embrace consideration of the supply-side economic arguments in the budget model?

Ms. RIVLIN. I think that any reading of CBO reports and discussion over the last couple of years, and particularly over the last few months, would indicate that we are intensely interested in the supply side. We have put a lot of emphasis particularly on productivity. We do not have any answers; we are just worried about the problem.

Representative BROWN. Let me go back to my line of questioning about the difference in Federal expenditures.

What about the difference in tax cuts? Would you assume that every tax cut is essentially the same in its impact on the economy?

Ms. RIVLIN. Absolutely not.

Representative BROWN. I think they are called by a term which offends me as a taxpayer and an individual citizen, and they're termed tax expenditures, but I prefer to think of them from the citizen's standpoint rather than the Government's standpoint as tax cuts. But they are not the same?

Ms. RIVLIN. No. Definitely not. I think commonsense would tell you that they are not.

Representative BROWN. Is the model treatment the same? We are talking about models, now. How does the model treat them?

Ms. RIVLIN. There are different models.

Representative BROWN. How does the model used by the CBO, which I guess is the one on which you are——

Ms. RIVLIN. No. What I think I explained this morning is that we do not have a model. We use a variety of models, depending on the purpose. In general, the impact on the economy of changes in major taxes can be picked up in these models. There is certainly a difference among taxes; for example, between what you would expect to happen if you cut general income tax rates, and what you would expect to happen if you cut corporate rates or introduced an investment tax credit.

Representative BROWN. Or 10–5–3.

Ms. RIVLIN. Or 10–5–3. The 10–5–3 depreciation schedule or an investment tax credit would operate more directly on increasing the rate of return to investment than would, say——

Representative BROWN. Which, if we are nonproductive now, or if our rates of production are declining, would seem to be recommended at this moment in history, would it not?

Ms. RIVLIN. For increasing investment? Yes. I think there are more——

Representative BROWN. And productivity. You are concerned about productivity, and so am I. I am trying to get on common ground here with you. Would that not stimulate productivity?

Mr. RIVLIN. In general, yes. If one were choosing between a specifically investment-oriented tax cut and a general tax cut, one would expect a specific tax cut to have more impact on investment and on productivity.

Representative BROWN. All right. Let me, if I may, make a comment in closing.

I come from the central part of Ohio where we have just had a 6-month strike at International Harvester that devastated a fairly sizable community. One of the great issues in the strike was the ability of the company to assign overtime to its employees and expect them to show up.

The issue was that the employees do not want the overtime when it is available. So there is a discretionary issue here, because the overtime puts them into higher tax brackets and, frankly, it is not worth it to them. I have had them explain this issue to me on a very personal basis, in short, Anglo-Saxon expressions [laughter] and I think they are sincere about it. So I would have to argue with you on your com-

ment a moment ago that tax rates do not affect people's attitudes about work effort. They clearly do.

Ms. RIVLIN. No, I did not say that, Congressman Brown. I said that the general evidence is that for full-time workers it does not make a lot of difference, and I emphasize that "lot"; for secondary earners, it makes more.

Representative BROWN. Well, my time is up, but these are full-time workers. They have the opportunity either to work overtime or not to work overtime, and the company wanted to assure that they had a full shift when they assigned overtime and they said, "Heck, no; I won't go," or something like that.

Ms. RIVLIN. That is an instance in which it makes a difference.

Representative BROWN. Thank you.

Senator BENTSEN. Senator Roth, did you care to question the witness?

Senator ROTH. Yes, I do.

Senator BENTSEN. I kind of thought you might. [Laughter.]

Senator ROTH. Thank you, Mr. Chairman.

First let me say, Mr. Chairman, that I was pleased to hear both you and the ranking member testify to the effect that current policies of throwing people out of work is not the way to approach the problems of productivity of our economy.

I like to put it this way: I think we Republicans learned long ago that recession was not the way to fight inflation or help the economy. I just might point out in my judgment that in 4 short years "Jimmy Who?" has become "Jimmy Hoover."

But in any event, I am pleased to hear that the CBO is beginning to be concerned about supply-side economics.

Now the first question that I would like to ask you, Ms. Rivlin, is: Is there anything in the current proposed budget resolution that really does anything about productivity? What aspects of the new budget would you say deal with supply-side economics?

Ms. RIVLIN. I do not know that there is any major new program in the budget that enhances productivity. There are not many major new programs in the budget at all. I think if one were looking through the budget to see what is the Government doing that might enhance productivity, one would single out research and development programs, and human resource development programs. But the question of whether that is enough and what more we can be doing is a different question.

Senator ROTH. Well, let me point out that we have in place some of the largest tax increases in the history of this country coming about in the next 10 years.

Now you say that our models do a poor job of analyzing very large tax cuts beyond historical experience. What about very large tax increases? As I just mentioned, there are substantial tax increases facing the economy. You have tax bracket creep from inflation; you have the social security tax increase; you have the windfall profits tax; so that we will be taking out almost an additional $2 trillion over the next 10 years.

Now much of this money, in my judgment, must be used to cut taxes if the private sector is not to collapse. It should be pointed out that even large tax cuts will not in any way be net tax cuts. You would

almost have to have, what, a $200 billion tax cut a year to offset the increases now going into effect. Is that correct?

Ms. RIVLIN. Certainly this is a tax-increase budget. There is no denying that.

Senator ROTH. How about the years ahead?

Ms. RIVLIN. Well, the years ahead depend on what the Congress decides to do. The major source of tax increase this year is the impact of inflation on a progressive income tax structure. But we also have rising social security taxes, we have new taxes in the form of windfall profits tax——

Senator ROTH. To what level will revenue rise in the next 5 years, according to CBO predictions, from current——

Ms. RIVLIN. In dollars. I do not have that in front of me, but we can certainly supply it for the record. We do not make a prediction of what the Congress will do about tax rates.

Senator ROTH. No, but you——

Ms. RIVLIN. All we do is project out the current law.

Senator ROTH. Well, that is exactly what I am asking. What do we have in place now? What is the CBO budget estimate for 5 years hence?

Ms. RIVLIN. I can supply that for the record. I do not have the number in my mind, but we do have it.

[The following information was subsequently supplied for the record:]

FIVE YEAR PROJECTIONS OF REVENUES UNDER CURRENT LAW, FISCAL YEARS 1981–85

The most recent CBO five-year projections of revenues under current law were prepared for the Senate Budget Committee mark-up of the First Concurrent Budget Resolution for Fiscal Year 1981. These projections, which are based upon the March 5, 1980, CBO economic assumptions, and which do not include the oil import tax, are as follows:

	Billions of dollars
Fiscal year:	
1981	606.6
1982	706.8
1983	814.1
1984	940.2
1985	1,087.7

Senator ROTH. Well, I think you will find that revenues will be up over half a trillion dollars by 1985 and taxes will go up something like $2 trillion by the end of this decade.

Does that reflect, in your judgment, any concern, or any recognition of supply side economics? I am talking about what we have in place now. I am not talking about what Congress may or may not do.

Ms. RIVLIN. I think, that, on grounds of enhancing productivity, one could make a strong case for certain kinds of tax cuts, and conceivably for certain kinds of expenditure increases on research and development and other productivity enhancing things.

Senator ROTH. Well, it is my understanding that tax revenues are going to go up another $400 to $500 billion by 1985. Is it not a fair statement to say that really this new budget, the 1981 budget, is merely a continuation of past practices? It provides for no tax cuts. It provides for no supply side changes.

What concerns me is that rhetoric today is becoming very good; but I do not see this Congress or this budget in any particular way taking action to recognize the problems of productivity. I would just like to ask you whether you do.

Ms. RIVLIN. This is certainly not a budget that recommends major tax cuts. The Budget Committees had that option. They have reserved some funds for doing that. But the Budget Committees recommended that this was the year to balance the budget.

Senator ROTH. By permitting taxes to increase substantially.

Thank you, Mr. Chairman.

Senator BENTSEN. Congressman Rousselot.

Representative ROUSSELOT. Thank you, Mr. Chairman.

Ms. Rivlin, nice to see you again. We are glad to see that the CBO is becoming interested in longrun growth and supply side economics. I remember very well just a few years ago when I was on the Budget Committee writing you letters and receiving letters in return, a kind of downgrading of the whole idea. So I am delighted to see this change of approach.

Ms. RIVLIN. I would invite you to look back at those letters.

Representative ROUSSELOT. I have them right here [indicating]. Do you want me to read them? [Laughter]. Funny you should bring it up. [Laughter.]

Ms. RIVLIN. It was our perception that we felt strongly then, as now, that the supply side was important.

Representative ROUSSELOT. Well, I think you once told me that econometric models could not do a good job of taking into account incentives on the supply side of labor——

Ms. RIVLIN. Oh, that's——

Representative ROUSSELOT [continuing]. Or savings——

Ms. RIVLIN. That is right. I believe that they have not done a very good job on that.

Representative ROUSSELOT. [continuing]. But that the effects were probably not that great, anyway. I assume you have changed your thinking on that.

Ms. RIVLIN. I said that the shortrun effects were probably not large.

Representative ROUSSELOT. Oh, I see.

I have seen some CBO reports which implied that the economy would remain strong as long as consumption spending stayed high, and saving rates stayed relatively low.

Now this is obviously a shortrun concept, totally at odds with our longrun needs. Yet the CBO never mentioned that the concept could not be pushed too far.

May we expect that your reports in the future will be as supportive of saving and longrun growth as your testimony here today?

Ms. RIVLIN. Yes, you may. But I think if you will look back at our January report to the Budget Committees, you will find a lengthy presentation of the importance of productivity and supply, and of increasing investment at the expense of consumption. That statement is much stronger than anything I have said today.

Representative ROUSSELOT. Are we still getting forecasts out of the CBO which imply that Government spending is more stimulative than the right kind of tax cuts? Are we still going to get that?

Ms. RIVLIN. Than the "right kind of tax cuts"?

Representative ROUSSELOT. Yes. Well, you said there were some kinds that work, and some kinds that do not.

Ms. RIVLIN. In general, one can expect that in the shortrun the models, although they are now being reviewed and revised, will show a bigger impact of Government "purchases" than of an equal volume of general tax cut. That has been the empirical result of studies that have been made.

You might try that on the econometricians on the next panel.

Representative ROUSSELOT. Well, I think we probably will. And we note, since you say that you are just a "buyer" and "subscriber" of econometric models—they are not all the same—that the input to them from the starting point is just as important as what you get as the final product.

Does the CBO still treat all tax cuts as if they were alike and relatively ineffective?

Ms. RIVLIN. We have never treated all tax cuts as though they were alike.

Representative ROUSSELOT. Well, I can remember——

Ms. RIVLIN. We have been at pains, Congressman Rousselot, to point out persistently that the impact on investment of specific investment-oriented tax cuts was likely to be considerably larger than the impact of a general income tax cut. That is only commonsense.

Mr. ROUSSELOT. Maybe if California goes with an income tax cut, you can study that to some degree to determine what the effect will be on the economy. The impact of "13," which I realize was a very special tax cut, was certainly interesting.

But are you attempting to input into any of your estimates specific tax cuts that have been tried in other parts of the country?

Ms. RIVLIN. We have not been. If there are studies of specific State and local tax cuts and of their impact on local economies——

Representative ROUSSELOT. Or let us say, in an economy as large as California's.

Ms. RIVLIN [continuing]. We would be very interested in that. Maybe my colleagues know about such. It is always very difficult to isolate the effect of a tax cut on a State economy.

Representative ROUSSELOT. As "small" as California.

Ms. RIVLIN. California is very big——

Representative ROUSSELOT. Thank you.

Ms. RIVLIN [continuing]. But data about specifics are not collected very well at the State level.

Representative ROUSSELOT. But some financial institutions like Security Pacific, Bank of America, and others have done rather extensive studies on the impact of proposition 13, for instance.

Ms. RIVLIN. That this could be of great interest to us.

Representative ROUSSELOT. Oh, good. And you have not looked for those?

Ms. RIVLIN. I do not know. Have we?

Mr. BEEMAN. We have examined some early results, but we have not really——

Representative ROUSSELOT. You are open for suggestion.

Mr. BEEMAN. Most of the results really are not in yet. It is still pretty early since that tax change occurred. There is not yet much data to examine.

Representative ROUSSELOT. Two years is a short time, I guess.

Ms. RIVLIN. Let me ask Robert Reischauer, who is our Deputy Director and resident expert on State and local taxes, to say a word.

Mr. REISCHAUER. Mr. Rousselot, when proposition 13 was passed in California, we did do a study on the impact of that tax cut, both on the Federal budget and on the Federal economy.

The proposition 9 movement in California is one that we have been keeping tabs on. I have been in contact with Larry Kimball at UCLA and the forecasting effort they have, as well as some of the information from the banks.

So we are cognizant of this and are keeping our eye on it.

Representative ROUSSELOT. Well, we hope you can pass it on to the rest of CBO.

Thank you very much.

Senator BENTSEN. Thank you very much, Congressman Rousselot.

Congresswoman Heckler.

Representative HECKLER. I would just like to ask why it is that the models seem to regard savings as a drag on the economy. Is not savings essential to pay for investment and growth? Do not savings get borrowed and put back into the economy? It seems to me that some of the models overlook that relationship.

I would also question whether or not there is a real value to having Government policy which promotes an incentive for savings.

Ms. RIVLIN. This again goes to the problem of long run versus short run. Clearly, saving is necessary to promote investment and increase productivity, and this is a very important point. We have made the point, and the model builders are certainly cognizant that, over time, if we intend to increase investment and improve productivity, we really have to sacrifice consumption in the short run in order to save more and invest more. That is a longstanding tenet of economics.

In the short run, if you are thinking about the level of economic activity, then consumption may hold up the current level of economic activity. Indeed, this is what happened last year. It was one of the surprises to economists that, in the face of falling real incomes, consumers went on spending at such high rates, substantially cutting into saving.

Now in the short run, that meant that the economy was functioning at a higher level than it might otherwise have been. It held up retail sales. Presumably, it prevented the recession from coming as quickly as might otherwise have happened.

So, if you are talking about the current level of economic activity, one might regard that as a plus. If you are talking about longrun growth, then clearly having a low-savings rate is not a plus.

Representative HECKLER. Obviously the level of consumption at the moment has been contracted to the point where this is now becoming one of the very serious negative factors in our economy.

I do not know how you would respond to the need for savings incentives at this point—whether it would be desirable or undesirable, in the short run, let us say.

Ms. RIVLIN. I do not want to make a pronouncement on "desirable" or "undesirable" policies.

Representative HECKLER. But in terms of economic impacts, budgetary impacts.

Ms. RIVLIN. Of what? Of an increased incentive to save—in terms of, say, tax cuts on interest or something like that?

Representative HECKLER. Exactly.

Ms. RIVLIN. I think those have to be weighed against other possible uses of the same funds. Again, the question is what would be the most effective way to use a tax cut to increase productivity.

The evidence on cutting taxes on interest is fragmentary and mixed, but it does not show conclusively that it would increase savings a lot. I think there might be more evidence that tax incentives are more effective on the investment side.

Mr. Beeman, did you want to add to that?

Mr. BEEMAN. At the moment, some of the best evidence that we have found on this issue is the Canadian experience. The Canadians do have some exemptions for interest, and some incentives for saving.

We are now looking at those data to see what we can learn from that experience about whether there is an increase in aggregate saving as a result of those incentives.

It is a very complicated issue, because some of the proposals do not work at the margin. That is, many people already would more than qualify for those tax savings, and the question is: Would they save more? If the incentives do not apply at the margin, it is questionable. But we are looking at the data from Canada, and I think that may produce some interesting results.

Representative HECKLER. Is that data of sufficient duration to yield a very perceptive conclusion?

Mr. BEEMAN. It certainly will not be conclusive.

Representative HECKLER. In other words, have the incentives been in the Canadian law long enough to be a yardstick for what might occur in the United States should we enact the same type of proposal?

Mr. BEEMAN. I think that some of them have been in effect since the early 1970's.

Representative HECKLER. That would be a decade, almost.

Mr. BEEMAN. Yes. And we can look at that data and see what the effect has been. We can also look at the studies the Canadians have done as to how much effect they think there has been. We intend to report on that quite soon.

Representative HECKLER. That would be very interesting.

Thank you, Mr. Chairman.

Senator BENTSEN. Thank you.

Let me strongly recommend that you also look at France, because the French have done some rather dramatic things with tax exemptions for the purchase of stock. The French Economics Minister told me that when they put it into effect, the one thing Frenchmen understand is not paying taxes. [Laughter.] He said they had a dramatic increase. Savings came out of the mattresses and every place else.

Now we have four very distinguished economists to testify, and I have a lot of questions I would like to ask Ms. Rivlin, but I am frankly going to defer mine.

If some of the members would like to go ahead, we will go ahead.

Representative BROWN. Mr. Chairman, I think we ought not to hold up on the other economists. I think it would be wonderful if we could

have Ms. Rivlin back for a whole morning, because I think we would all enjoy it.

She is quite capable of taking care of herself in questions and answers. There are some policies that you are going to be influential on, Ms. Rivlin, and I think we would all like to have a chance to discuss some of these concepts with you.

Ms. RIVLIN. I will be delighted to come back at the convenience of the committee at any time.

Senator BENTSEN. Thank you, Ms. Rivlin. May we then pass, so far as further questions. We are very appreciative of your testimony this morning. It is helpful in having us better understand your views and that of your staff.

Thank you.

Ms. RIVLIN. Thank you, Mr. Chairman.

Senator BENTSEN. I would like to ask the other witnesses this morning to please come up. I would like to have Mr. Otto Eckstein; I would like to have Mr. Michael Evans; Mr. Lawrence Klein; and Mr. Norman Ture. Would you each come up?

We have such distinguished witnesses, I am going to resort to going alphabetical.

Mr. Eckstein, that means you go first and they have the opportunity of rebuttal. So if you would proceed, I would ask each of you, if you will, to summarize your prepared statement so we can get to the questions.

STATEMENT OF OTTO ECKSTEIN, PRESIDENT, DATA RESOURCES, INC., AND PAUL M. WARBURG PROFESSOR OF ECONOMICS, HARVARD UNIVERSITY, CAMBRIDGE, MASS.

Mr. ECKSTEIN. Thank you, Mr. Chairman.

I think we are meeting here today at a rare moment of opportunity for supply economics. The current recession provides an opportunity. The current fiscal plan of the Government—which is summarized in table 1 of my prepared statement—does call for enormous tax increases and enormous swings in the full-employment budget.

Energy taxes will be up $25 billion in 1980 and 1981. Payroll taxes are up $23 billion. Inflation will boost the personal tax take by $28 billion. And to undertake that kind of a tax increase without a serious thought of using some of those resources to get the longrun growth of the economy going would be rather dangerous, considering——

Senator BENTSEN. A rather serious what? I didn't hear you. What did you say?

Mr. ECKSTEIN. I said, to go through with all those tax increases without seriously devising a use for some of those tax resources for a means that will raise the longrun growth of the economy would be very dangerous, considering that the economy is in a slide, which is certainly the second worst since World War II, and may well prove to be the worst.

We are estimating in our new interim forecast that the economy is now declining at a rate between 8 and 10 percent and may well be the worst quarter, even worse than in late 1974, early 1975. And although we are not that gloomy on the outlook as a whole, we think it will come back rather quickly. Nonetheless, to put in place tax increases which

are only very, very partially offset by other measures which will swing the full-employment budget by over $50 billion while the economy is in a slide, really is not a viable position.

So the opportunity for tax reduction or expenditure increases is inevitably ahead. It is very hard to see how you could not make some moves for 1981, since you will be looking at major tax increases on January 1.

So the challenge is to use those resources wisely.

We have learned in the past that to quickly create new, hasty countercyclical spending programs is ineffective; that they come too late; that we cannot reverse them; and indeed that is how we have created the current economic impasse of 9- to 10-percent core inflation, the necessity to create a recession in order to save ourselves from ever worsening inflation. We did that partly by overreacting to the past recessions, including particularly the recession of 1974–75 when tax cuts were too large and too much consumer oriented, and when spending programs were launched which probably should have never been launched.

So the moment is at hand. The intellectual capital that is available is supply economics. Now supply economics is very old. I recite in my prepared statement some of the highlights of that literature. Let me only say that the 1950's and 1960's were much the most fertile decade in the history of economic thought in terms of developing the basic ideas of supply economics.

But it is true that the impact of that work on the models and the logic that was used to devise the aggregate economic policies was very slight. We relied in the 1950's and 1960's, and even much of the 1970's, on analysis which focused on demand. And that was not necessarily in error.

It was true through that period that the level of activity was determined by demand management. Now in that process, we overlooked what we were doing to the productivity of the country; but those demand-oriented analyses told us generally the right thing to do.

They told us that the economy needed a lift in the early 1960's. Those analyses told us we needed much more restraint than we actually got in the late 1960's during the Vietnam war. It really worked quite well until OPEC, in 1973, when the supply side really did become central to the development of the overall activity.

Since OPEC, it has been the case that supply factors have dominated the actual path of the American economy. The recession of 1974–75 was heavily related to the energy problem and to the imbalance in industrial structure—between the supply of physical capital and supply of labor, which created the inflation of 1970, 1971, 1972, and which again helped create the inflation of 1978–79.

Well, we model builders, we are not responsible for all economic research in the world. All we can hope to do is to build on the state of knowledge that there is. And so, since 1973 we have moved, as well as we could, to build those supply factors into our models.

We added energy sectors. We added more elaborate financial sectors. We added input-output calculations. We did a lot of things. But one of the things we did not do very aggressively was to focus on the question of the effect of the tax system on the supply of labor and the supply of saving; but we did focus quite well on the corporate income tax side.

We did focus fairly well on the impact of various kinds of corporate tax changes on the supply of capital, and therefore to some extent the supply of potential output.

Now what we have done in the DRI model is summarized in the report that your committee has published, and I do not want to repeat all of that. I think what I would rather do is first to quickly focus on table 2 of my prepared statement, which summarizes in a very, very skeletal form what the current treatment is of tax rates in our model—and I do not believe it is dramatically different from the other models.

On the corporate income tax side, we have always modeled the impact of the tax rate on the level of investment in the aggregate by individual industry. We have more recently added the impact of the corporate tax on research and development. That can be done on the basis of the well-established theory of my colleague, Professor Jorgensen, which is generally followed by everybody in this field.

I show you there the elasticities of response, and you will want to have your own staffs compare what these elasticities are across models. And I am sure that Ms. Rivlin's organization, the Congressional Budget Office, will also be doing that kind of comparison. And, of course, in that work, along with the work being done by other people—including a very interesting paper just released by the National Bureau of Economic Research—you will see where the concensus really is on these supply responses to tax changes.

In the case of the personal taxes that we have now included, the effect of the personal tax burden on labor supply, I think on that issue we were all lulled into a sense of lack of interest by the important studies done 20-some-odd years ago at the Harvard Business School which found, through a lot of detailed research, that the effect of taxation was not very great. Indeed, some was helpful; some was damaging; and I think the conclusions of those Harvard Business School studies really dominated the field for 20 years.

It was not until the work of Professor Feldstein and others that we really reexamined that set of conclusion. Also, as we ran the rather nasty experiment of raising the personal tax burden on the ordinary working family by 50 percent—because that is the increase from 1965 to 1980, combining personal and payroll taxes—it is only when we ran that experiment that we began to have the data to see whether that level of taxation would discourage people from working.

Now again, we should add quickly, in the aggregate the willingness of people to work has risen and risen. The employment ratio is at an alltime peak. But that is mainly due to sociological change of the willingness of women—in fact, the eagerness of women—to enter the labor force.

There are clearly some losses that can now be identified through econometric studies on groups who are discouraged by the tax burden from working.

In the case of the personal taxes, of course, it is not only the supply of labor; it is also the effectiveness with which resources are used. We find some very limited effects of the personal tax burden on aggregate factor productivity as measured through potential output.

In the case of savings, there we find we are really in a more preliminary stage of our work. We do find that interest rates have some effects on consumption, but they are very limited. They seem to be

67-052 O - 81 - 3

confined to—perhaps to the biggest of the durables: automobiles and big appliances.

We also find, of course, that it is the real interest rates, not the nominal interest rates, that matter. So it is possible to change rather more than we used to think. We used to think that you cannot affect it at all—the ability to augment capital formation.

Let me turn very quickly to the results that we found in our simulations which tested out some of these ideas.

If you look at table 3 in my prepared statement, there you see a test with our current version of the DRI model, where we changed personal taxes rather massively.

We took the scale of the Kemp-Roth cuts, 30 percent over 3 years, and we took the pure—which I would take, the already obsolete version of Kemp-Roth—with no offset. I view that at the moment as a somewhat obsolete idea.

But if you do that, if you just cut taxes without any offset, keeping real interest rates the same, then you do get the result that you make inflation worse. Of course, you augment labor supply; 300,000 more people work. You do raise productivity, both because of a lower tax burden and because the economy is a lot busier and using resources more effectively.

But, without offset, there is a major inflation price to be paid, and you worsen the core inflation rate by about a point by 1985; and that clearly is a price we are not willing to pay.

Senator BENTSEN. I am trying to understand this table. You are saying that is the Kemp-Roth tax cut?

Mr. ECKSTEIN. It is that type, yes.

Senator BENTSEN. And where——

Representative ROUSSELOT. Well, is it exactly the same or not?

Mr. ECKSTEIN. No. All it is is 10 percent a year reduction in personal taxes; nothing except personal tax cuts with Government spending unchanged.

Representative ROUSSELOT. Is this 10-percent reduction a reduction in tax "rate"?

Mr. ECKSTEIN. No, in the level. In 10 percent of the revenue.

Representative ROUSSELOT. Thank you.

Representative BROWN. So it does not focus on where the tax cut comes, or what the incentives are encouraging by the tax cut? It is just a tax cut?

Mr. ECKSTEIN. Across the board, presumably, corresponding to widening the brackets—which, of course, lowers the rates, but does not focus on any particular rates.

Now it is not surprising. I think you will find that any serious study comes up with that conclusion. And I am very pleased to see that there is a softening in position of the Kemp-Roth advocates that they are more preoccupied now with "where do you find the spending reductions," and what other measures you have to package with the Kemp-Roth reductions to achieve the goals.

Now in table 4 of my prepared statement, we take the Kemp-Roth cut with an offset. We think that is the correct way to analyze the supply economics proposal. Because, otherwise, you really do get a hodgepodge of demand and supply effects. And, of course, in the very short run, the demand effect will always swamp the supply effect.

And, of course, the mistake we have made over the last 20 years is that we have always looked at the shortrun demand effects, and have thereby ignored what we are doing to the longrun growth potential of the economy.

It is only now, at least since 1973, that we see that in the process we have thrown away the good part of our productivity potential.

Well, if you offset the personal tax reduction with, in this case, a reduction in Government spending for goods and services of a civilian type—which actually is a very drastic cut in that element—what you get is an increase in real GNP, an increase in potential GNP because you have a larger labor force by 200,000 people who work at a little better productivity, and you actually achieve a reduction in the core inflation rate and in the actual inflation rate.

We replayed that same simulation using monetary policy rather than Government spending as the offset, and you get essentially similar results. Although the Federal Reserve will have to be very clever to bring down the money supply sufficiently at the time the tax cut is enacted to achieve the same overall level of activity in the economy, so that you are achieving the redress in the use of the factors of production that you are shifting from producing just for consumption for investment.

We also took a quick look at the corporate cuts. There, it is old territory. The conclusions are old. We all understand them. I think again the concensus which is built into the DRI model says that you get a bigger bang for the buck on investment if you focus it on tax incentive measures rather than across-the-board rate cuts.

The only investment thing going for the rate cuts is that they help the equity markets. And, of course, in the longrun that will have some benefit to capital formation, but that is still a pretty unknown territory.

Well, let me, since my time has expired, summarize very quickly.

I think we are at an exciting moment where we have the opportunity to use resources well to get our longrun growth going once more. Now I would place the priority—and just to summarize a little bit in table 8 of my prepared statement—I would place the priority on corporate reductions of an incentive type.

I would reform depreciation and bring it a little bit up to date.

I might even do an investment credit. And I think it would be more effective than corporate rate reductions, and it would at this juncture also be more effective at least in raising potential GNP than any personal tax cut that I can devise.

I think we would be very much remiss to throw this opportunity away. I do not think it will present itself again very soon. The tax increases may be very burdensome, but they all had some logic, whether they were payroll taxes or energy. We clearly cannot go through with them through this recession without some relief. And we have the resources in front of us now, and we have got to use them to get the longrun development of the country going.

Thank you.

Senator BENTSEN. Thank you, Mr. Eckstein. We will hold our questions until we get through the witnesses.

[The prepared statement of Mr. Eckstein follows:]

PREPARED STATEMENT OF OTTO ECKSTEIN

A Time for Supply Economics

The current recession poses an extraordinary opportunity to put the U.S. economy on a better development path for the 1980s. The severity of the decline makes fiscal stimulus inevitable, particularly given the $73 billion two-year swing in the full-employment budget (Table 1), with new energy taxes raising $25 billion by 1981, payroll taxes up an extra $23 billion, and inflation boosting personal taxes by $28 billion, the economy would be sustaining the most severe tax increases attempted since the outbreak of World War II. We need a balanced budget badly, but the program of tax increases now on the books cannot be implemented fully in the midst of a severe recession.

How should the fiscal plan be modified? We have learned the bitter lesson that aggressive policies against recession have been among the principal causes of the present economic impasse. Policies of successful stimulus ended with the tax cut of 1964. The major moves since then, whether they were the New Economic Program of 1971 or the hastily conceived anti-recession spending programs of 1975–78, precipitated excess demand which worsened core inflation and ultimately necessitated credit crunches and painful recessions. If history is any guide, the traditional approach of rushing to fight recession with across-the-board tax reductions and abandonment of budget discipline can only lead to a repeat of the cycle: quicker recovery of 1981–82, to be followed by higher core inflation, another boom, a third round of OPEC price increases, and another credit crunch and recession.

TABLE 1.—RECENT BUDGET ACTIONS: A DETAILED VIEW OF CURRENT POLICY

[Calendar years, billions of dollars]

	1978	1979	1980	1981
Full-employment [1] budget surplus or deficit (—)	−29.9	−12.4	1.2	51.0
Change from previous year	4.5	17.5	13.6	49.8
Due to:				
Expenditure cuts [2] (— indicates cut)	1.2	6.0	−7.0	12.1
Inflation-induced personal [3] tax increases	5.7	8.7	12.4	12.9
Social insurance tax rise	8.0	10.1	5.6	17.1
Windfall profits tax (net)			6.1	8.9
Oil import levy/gas tax			7.1	2.8
Other	−1.4	1.4	2.5	−4.0
Tax cuts (—) [4]	−9.0	−8.7	−13.1	0

[1] Assumes 6.1 percent full-employment unemployment rate.
[2] Dollar magnitude of the change in the full-employment expenditure-to-GNP ratio.
[3] Assumes an elasticity of personal taxes with respect to taxable income of 1.5.
[4] This item also includes the impact of the Revenue Act of 1978 and the 1977 tax cut.

I believe that virtually every responsible observer of the economic scene, whether economist, businessman or political leader, understands this basic situation and is not at all anxious to continue to pursue the pattern of policies that has worked so badly in the last 15 years. But what should be done? Here, too, I believe there is general agreement among serious people covering a broad range of the political spectrum: the next set of economic policies must deal with our fundamental problems, namely, the lack of productivity growth, worsening core inflation, decline in our international competitive position, absence of progress in family living standards, and a weakened leadership role for the United States.

THE NEW SUPPLY ECONOMICS

The intellectual capital available to deal with long-term problems is (a body of knowledge) known as "supply economics." While supply antedates demand in the history of economic thought starting with the work of Adam Smith (1776) and stretching to John Stuart Mill (1848), and always retained at least an equal share with demand in the field of microeconomics, it must be acknowledged that demand overshadowed supply in macroeconomic analysis since the Great Depression and the rise of Keynesian national income analysis (1936). In the serious academic literature, however, supply theory regained prominence rather quickly: the path-breaking growth model of R. F. Harrod (1939) analyzed, at least in a primitive way, the need to match the growth of aggregate supply and

aggregate demand, and the model of Domar (1946) introduced Harrod's ideas into the American literature. The modern theory of growth initiated by Solow (1956) revived the aggregate production function of Cobb-Douglas, showed its central role in the economy, and launched a search for better aggregate production functions. Even in the Keynesian years, the input-output analysis of Wassily Leontief (1939) offered theoretical and empirical models which had a production and supply focus. Kuznets' studies of economic development, Kendrick's and Denison's analyses of growth and productivity, Schultz' and Becker's work on human capital, and large body of writings by Griliches, Jorgenson and many other scholars made the 1950's and 1960's the most fertile decades for the scientific study of the supply-side of the economy.

However, this body of work had little impact on the macroeconomics used for policy. Aggregate demand seemed to be the determining factor of output and the price level in the postwar decades. The growth of aggregate supply could be modelled adequately by the simplest productivity calculations, multiplying labor supply by a productivity trend derived by historical extrapolation. Okun's law, which was based at least implicitly on these productivity projections, seemed perfectly adequate to identify the gap between aggregate demand and aggregate supply, to estimate the unemployment rate and to help set the gauges for fiscal policy. The great tax cut of 1964 was derived from Okun's law estimates of the "gap" divided by accepted estimates of the multiplier on personal tax cuts. Even in the immediate years after 1965, when demand became excessive and highly sophisticated methods for estimating aggregate production functions were available, the simpler methods seemed to suffice: taxes should have been higher, but it was not a shortcoming of economic analysis that made policy wrong.

The large-scale econometric models which began to take over the tasks of policy analysis in the early 1970s did contain some supply-side elements: aggregate production functions, sophisticated equations for investment and capital stocks, detailed measures of industrial production and capacity, and equations for the availability of finance. But the production functions used were still relatively simple and unresponsive, following the Cobb-Douglas tradition in which the link of investment to potential output is relatively weak and slow, and the technology residual is exogenous and impervious to policy. Energy was not in the picture, of course.

The decade of the 1970s posed different and increasingly serious challenges to macroeconomic analysis. The worldwide boom of 1971–73 produced acute shortages of capacity in the materials-producing industries even though aggregate measures did not signal shortages. The OPEC revolution of 1973 and the subsequent surges of world oil prices had devastating effects on the economic performance of the entire industrial world. The end of productivity growth in 1973 and the resultant explosion of employment repealed Okun's law or any simple calculation of the productivity trend.

These changes posed a challenge to economic policy which has produced several disparate responses. The first was a call for economic planning, to assure that specific shortages of individual commodities would never again abort general economic growth. The Humphrey-Hawkins movement sought analyses, reports, and policy commitments which would have enlarged the degree of government responsibility for the assurance of supplies in the private economy. The culmination of this movement was the passage of a watered-down Humphrey-Hawkins Act, whose main product so far has been the embarrassment of defining unattainable goals.

A more recent strand of supply-oriented economic policy owes its origin to Colin Clark, the distinguished Australian econometrician who first advanced the thesis in the late 1940's that a tax burden in excess of 25 percent would lead to inflation. He argued that higher tax burdens would discourage saving and work, reduce the supply of output, and nullify the Keynesian effects of demand restraint. The Clark thesis fell on deaf ears, perhaps because many western countries pushed past the 25 percent tax limit without apparent damage to economic performance. The important set of studies conducted in the early 1950's by the Harvard Business School on the effects of taxation on work and investment also induced complacency by finding those effects to be small and of uncertain direction. However, a series of theoretical and econometric studies by Feldstein and others began to find more important tax and transfer disincentive effects. By 1975 the Clark idea was revived by Laffer, Wanniski, and Roberts, who emphasized the disincentive effects of excessively high marginal tax rates. In the more extreme form embodied in the "Laffer Curve,' the thesis became the basis of the

Kemp-Roth movement, which would cut taxes without any restraining offset such as lower government spending or tighter money on the theory that the benefits to aggregate supply would outweigh the boost to demand.

SUPPLY-SIDE ECONOMICS IN THE DRI MODEL

The supply features in the DRI model are described in the Report recently prepared for the Joint Economic Committee, "Tax Policy and Core Inflation." The idea of supply is so pervasive in economics that over half of the 800 equations in the model could be characterized as supply-oriented. However, the supply issues that pertain to policy are far more limited. Table 2 describes the critical supply policy features in the current DRI model. Some features have always been part of the model, while others have been developed in the last year. The effects of corporate tax changes on investment have long been established in the scientific literature and are fully modeled, using DRI's modification of the neoclassical Jorgenson theory of investment which adds more explicit financial effects and a more elaborate output expectations mechanism. DRI's inclusion of the effects of personal tax levy is relatively new. Previous econometric models made little allowance for the effects emphasized by Clark, Feldstein, Laffer and others because the literature was still very limited. DRI chose its current parameters after extensive exploration over various historical periods of estimation and alternate specifications. The parameters chosen were representative, not outliers in the statistical experiments.

The table also shows that the modeling of supply economics is far from complete. There is little in he model at this stage to represent the effects of taxes and social security on personal saving. Research on the effects of the tax system on the valuation of common stocks and the resultant impact on portfolio choices and corporate finance is at too early a stage to identify reliable equations. In addition, investment in human resources is not yet modeled explicitly. The remaining residuals time trends in the potential output and productivity equations are a measure of the analytical tasks still to be fulfilled.

TABLE 2.—SUMMARY OF TAX EFFECTS ON SUPPLY IN THE DRI MODEL

Tax	Equations	Results of statistical testing	Description of tax effects on DRI model
Corporate income tax rate.	Investment, macro and industries, R. & D.	Well-established effect using Jorgenson theory.	Affects rental price of capital and cash flow. Elasticity of investment with respect to revenue is −0.28 over the 1982–85 period.
Depreciation lives.....	Investment, R. & D..	Same.....	Same. Elasticity is −1.13.
Investment tax credit..	Investment on equipment, R. & D.	Same.....	Same. Elasticity is −0.90.
Personal taxes.....	Labor supply.....	Significant at 5 percent level, using average effective rate of personal income and personal payroll taxes. Transfer payments affect supply of workers over 65 and of women aged 25 to 44. Period of fit affects parameter. Value in model is typical.	Elasticity of labor with respect to tax burden is −0.04. Elasticity of labor with respect to tax-induced change in real wages is −0.20.
	Potential output.....	Average effective burden of personal and payroll taxes is significant at significance level of 5 percent. Choice of period affects parameter. DRI model uses typical value obtained over various intervals and various specifications.	Elasticity of potential output with respect to personal tax rate is −0.05. Extra potential raises productivity and lowers inflation.
	Savings deposits and bond holdings of households.	Savings flows affected by disposable income and by after tax interest return.	Principally affects mortgage market and residential construction.
	Wages.....	Payroll tax burden has impact on compensation per hour.	Higher compensation affects prices and core inflation.

ILLUSTRATIVE SIMULATIONS OF SUPPLY-ORIENTED TAX POLICIES

In order to use the new analytical tools in the current policy context, it is first necessary to define the basic supply multipliers or elasticities which show the

effects of the policies on the critical dimensions of the economy. A series of model simulations has been run to illustrate these tools.

In running these exercises, it is important to distinguish simulations in which supply measures are analyzed on the "different incidence" basis long established in the public finance literature from simulations in which both supply and demand effects are allowed to occur. The differential incidence method requires that an offset be defined which neutralizes the Keynesian aggregate demand effects. Pure supply multipliers can only be demonstrated if the total level of activity is held constant by an offsetting policy of restraint.

Broad personal tax reduction without offset under different economic circumstances

A typical Kemp Roth-type proposal, representing a 30 percent reduction of the personal income tax staged over three years, has been simulated without any offsetting measure of restraint. The real level of government purchases is left unchanged, and a neutral monetary policy is represented by an expansion of bank reserves which leaves real interest rates unchanged.

The first simulation applies the policy in an economy which is experiencing full resource utilization. Unemployment averages 6 percent in the base case. Other economic conditions are drawn from the actual situation of today, including an assumption of OPEC price increases of $6 in 1981 and $8 in 1982. Legislated domestic oil and gas decontrol will add to further energy increases. Social security tax hikes are another significant shock. The total shock inflation is estimated to average 2 percent for the next three years. The results of this simulation are summarized in Table 2 and Appendix Table 1. As is to be expected, the increase in consumer purchasing power created by the tax cuts drives the economy into a state of excess demand and worsened inflation. Low unemployment drives up wages by an extra 1 percent a year; high utilization of industrial capacity hurts delivery conditions and raises wholesale prices 1.6 percent a year. The GNP deflator is up by 1.8 percent by 1985. The Federal Reserve, under the rule of constant real interest rates, accommodates the inflation by providing the reserves for the higher rate of money growth.

There are important supply effects, to be sure. Potential GNP is up by 1.9 percent by 1985, and productivity is boosted by a similar amount. The labor supply increases by 300,000 people by 1985 because of the eased tax burden, a contributing factor to the better advance of potential. The capital stock also grows more rapidly despite the reduction focused on the personal tax side. Higher activity creates more profits and higher output expectations, thereby boosting investment by 3.3 percent a year. Higher demand and supply effects raise real GNP by 2.6 percent by 1985, compared to an increase in the price level of 5.0 percent, or an average of 0.5 percent a year for growth and 1.0 percent a year for inflation. Core inflation is worse by 1.1 percent in 1985.

While there is a net benefit to potential and actual output, the major effect of this particular package for boosting both supply and demand is to make inflation worse. The actual inflation rate is driven up over a few years because of the high level of demand. The core inflation rate worsens later because of the slow process by which the price expectations underlying the core are formed. However, if the basic goal of new policies is to escape from the current 9+ percent core inflation rate, the deterioration created in this critical measure of economic performance would make this particular policy option unattractive in the circumstances analyzed.

When this type of tax proposal is viewed in the context of a deep recession, the trade-offs become somewhat more favorable, though inflation is still worsened to an unacceptable degree (Table 3 and A–2). To analyze this case, a deep recession scenario was used as the baseline, and the above exercise was repeated. In an economy with slack, the tax cut creates less inflation and a larger boost in output. The increase in the inflation is 0.7 percent a year, and real output growth is also boosted by 0.7 percent a year. The supply effects are a little better in the slacker economy: the 5-year rise in the level of potential output is an extra 2.2 percent compared to the 1.9 percent boost in the base case.

These simulation experiments show that very large tax cuts without offset even in a recession economy have a serious unfavorable effect on prices. The effect of tax cuts without an offsetting decline in government purchases is initially the stimulation the "recession" economy needs. Unfortunately, these "stimulative effects" outlast the need for stimulation and aggravate inflation.

TABLE 3.—PERSONAL TAX REDUCTION WITHOUT OFFSET

	1981	1982	1983	1984	1985
Policy change (change in billions of dollars):					
Personal tax revenues	−29.9	−66.7	−115.5	−127.1	−137.1
Federal deficit (NIA)	−24.7	−53.2	−97.3	−118.3	−146.8
Effects (percent difference in levels):					
Real GNP	0.7	1.8	2.8	2.6	2.6
Real potential GNP	.1	.5	1.1	1.6	1.9
Labor supply	.1	.3	.4	.4	.3
Productivity	.2	.6	1.4	1.8	1.9
Difference in rates:					
Unemployment	−.5	−1.1	−1.3	−.9	−.8
Inflation rates:					
GNP deflator	.1	.5	1.2	1.8	1.8
Core inflation	−.1	.1	0	.5	1.1
Wages	.1	.7	1.4	1.7	2.0

Personal tax reduction with full Government spending offset

A simulation exercise based on the "differential incidence" method incorporating an offset to neutralize demand effects shows much safer results. A simulation was run in which a Kemp-Roth-type personal tax reduction was offset by reductions in Federal nonmilitary purchases of goods and services of sufficient magnitude to keep the unemployment rate unchanged. Since the demand multiplier of government purchases is inevitably somewhat higher than for personal tax reduction, such a package increases the government deficit somewhat. The simulation is summarized in Table 4 and A–3.

The supply effects of personal tax reduction are important, and are little effected by the government spending cuts. The rate of growth of potential GNP is boosted by 0.3 percentage points, bringing it to a level of 1.6 percentage points higher by 1985. The labor force is enlarged by 200,000 individuals because of the lower tax burdens, and the annual rate of productivity growth is boosted by 0.3 percentage points. Both the actual inflation and the core rates are improved by an average of 0.2 percent, principally because of the better productivity performance.

TABLE 4.—PERSONAL TAX REDUCTION WITH NO OFFSETTING GOVERNMENT SPENDING REDUCTION

[Lower base scenario]

	1981	1982	1983	1984	1985
Policy change (change in billions of dollars):					
Personal tax revenues	−30.7	−67.2	−116.5	−126.4	−134.2
Federal deficit (NIA)	−25.3	−52.9	−93.6	−105.1	−121.6
Effects (percent difference in levels):					
Real GNP	0.7	1.9	3.1	3.5	3.8
Real potential GNP	.1	.5	1.1	1.7	2.2
Labor supply	.1	.2	.4	.3	.2
Productivity	.3	.8	1.8	2.6	2.6
Difference in rates:					
Unemployment	−.3	−1.0	−1.3	−.9	−1.3
Inflation rates:					
GNP deflator	0	.3	.7	1.3	1.2
Core inflation	−.1	−.1	−.1	.2	.6
Wages	.1	.4	.9	1.0	1.4

TABLE 5.—PERSONAL TAX REDUCTION WITH OFFSETTING GOVERNMENT SPENDING REDUCTION

	1981	1982	1983	1984	1985
Policy change (change in billions of dollars):					
Personal tax revenues	−32.9	−75.5	−131.8	−154.4	−178.1
Federal deficit (NIA)	−20.3	−41.0	−65.7	−65.6	−68.6
Government spending	−11.6	−31.2	−59.6	−79.8	−99.6
Effects (percent difference in levels):					
Real GNP	0.1	0.4	0.9	1.3	1.6
Real potential GNP	.1	.4	.9	1.3	1.6
Labor supply	.1	.1	.2	.2	.2
Productivity	.1	.3	.7	1.2	1.6
Difference in rates:					
Unemployment	−0	−0	−0	−.1	0
Inflation rates:					
GNP deflator	−0	−0	−.2	−.4	−.2
Core inflation	−.1	−.2	−.4	−.5	−.5
Wages	−0	−0	−.1	−.2	−.2

Personal tax reduction with monetary policy offset

If a large personal tax cut is combined with the monetarist approach to Federal Reserve policy, the beneficial supply effects are allowed to occur, though there are some offsetting reductions in the supply of capital, particularly the housing stock.

A simulation was run in which the Kemp-Roth type of personal tax cut was offset by monetary policy designed to neutralize the aggregate demand effects. To do this, the supply of bank reserves is reduced substantially, thus leading to severe tightness in credit markets. This simulation is summarized in Tables 6 and A–6.

The gain in potential GNP of this supply-oriented package is 0.25 percent a year, or 1.3 percent in the fifth year. Productivity is up by similar percentages. The demand for credit is stronger and interest rates are markedly higher. With the higher rates, a greater velocity is inevitable, and therefore the Federal Reserve has to lower its monetary target in response to the tax cut. Inflation is lowered, with the core rate cut by 0.2 percent.

The government deficit produced by this package is also quite worrisome. The higher interest rates neutralize the feedback revenues, so that the increase in the deficit is not much smaller than the size of the tax cuts themselves. In the third year, after the final step of the tax reductions has occurred, the deficit exceeds a hundred billion dollars and is mounting rapidly.

The composition of output is also affected. The housing industry suffers from the high-interest rates, and so the average number of starts is reduced by 20 percent. On the other hand, real consumption is larger by 2.2 percent in 1985. Business fixed investment receives a small boost of 0.4 percent, which, along with the labor supply gain and the better productivity, combines to produce 0.25 percent a year pick-up in the growth of potential GNP.

Corporate tax cuts of three kinds

The analysis of corporate tax cuts, whether in terms of rates, depreciation reform, or investment tax credits in well-established terrain in which the DRI model reproduces the consensus results. Table 6 summarizes three exercises, all of them conducted on the differential incidence basis using a combination of personal tax increases and reduced government spending as the fiscal offsets. Real interest rates are left unchanged.

It can be seen, that, in the neoclassical investment theory under which decisions are made on the basis of present value calculations, corporate rate cuts are less effective than investment tax credits or liberalized depreciation. The impact of incentives on the rate of return on investments is substantially greater, per dollar of tax relief, than across-the-board rate reductions which are largely paid out on the profits earned on investments of the past. The cash flow effects are similar for the three measures in the model, although in actuality the incentive measures focus the augmented cash flow more accurately on those companies that have the strongest investment opportunities.

TABLE 6.—PERSONAL TAX CUT ACCOMMODATED BY MONETARY POLICY THAT KEEPS THE UNEMPLOYMENT RATE UNAFFECTED

	1981	1982	1983	1984	1985
Policy change (change in billions of dollars):					
Personal tax revenues	−32.6	−74.8	−130.6	−152.5	−174.7
Federal deficit (NIA)	−33.6	−77.1	−134.9	−160.3	−189.8
Effects (percent difference in levels):					
Real GNP	0.1	0.4	0.8	1.2	1.3
Real potential GNP	.1	.4	.8	1.2	1.3
Labor supply	.1	.1	.2	.2	.2
Productivity	0	.3	.7	1.1	1.3
Difference in rates:					
Unemployment	−0	−0	−0	−0	−0
Inflation rates:					
GNP deflator	−0	−.1	−.3	−.5	−.5
Core inflation	−.1	−.2	−.3	−.4	−.3
Wages	−0	−0	−.1	−.2	−.3

Rate reduction has the most favorable effect on the equity cost of capital for investment. The model reflects the apparent reality of stock valuation by investors in which publicly reported after-tax earnings are the valuation basis. Investment tax credits and depreciation allowances tend not to be fully flowed-

through to reported earnings, and consequently give a lesser boost to stock prices. It should be recognized, however, that this an assumed bit of irrationality on the part of investors, in which they fail to perceive that the gap between the taxes paid and taxes accrued is increased by the incentive measures.

In the Report I prepared recently for this committee, a policy of sizable tax incentives, in the form of depreciation reform and larger investment tax credits was presented in some detail.[1] The conclusions showed that a set of measures

[1] "Tax Policy and Core Inflation," study prepared by Otto Eckstein for the Joint Economic Committee, April 1980.

which would reduce corporate tax accruals by 18 percent after three years would accomplish a reduction in the core inflation rate of 1 percent by the fifth year; other inflation rates would be similarly reduced. Since this tax package represents a much smaller revenue loss than the large personal tax reductions analyzed above, it can be seen that corporate tax incentives are a much more efficient means to reduce the core inflation rate and boost the growth of potential GNP.

TABLE 7.—EFFECTS OF VARIOUS CORPORATE INCOME TAX REDUCTIONS

	Policy		
	Corporate tax rate	Investment tax rate	Depreciation reform
Percent change in levels (billions of 1972 dollars—1985):			
Investment in producers' durable equipment	2.6	9.4	12.0
Stock of producers' durables	1.4	4.3	5.0
Potential GNP	.2	.6	.7
Percent change in rates—1985:			
Implicit GNP deflator	.2	.2	.2
Core inflation	.2	.4	.7

The reasons are several. Whereas personal tax reduction relies mainly on relatively modest increases of the supply of labor and improvements of productivity, the corporate tax incentives create sizable boosts in the capital stock and therefore in productivity and potential GNP. The scarce tax resources therefore seem to be used more effectively in the corporate area. Further, the U.S. economy is currently not suffering from a shortage of labor, but it is suffering from a shortage of industrial capacity. The long period of regulation since the 1960's and the several decades of an over-valued exchange rate which eroded the competitive position of our primary processing industries have produced a major imbalance in the economy's productive structure: essentially, there is too much labor for the existing industrial capital stock. Therefore, as the economy reaches prosperity, the utilization rate of industry is in the inflationary range event while unemployment remains over 6 percent. Personal tax reduction does not lead to significant relief from these industrial bottlenecks, whereas investment credits and depreciation reform directly focus the tax resources where they are needed, in industrial investment.

The relative efficiency of the various measures in augmenting potential GNP and in reducing inflation is shown in table 8. This table shows the percentage reductions in the core inflation rate and the percentage increases in the level of potential GNP which can be achieved for every $1 billion of revenue reduction through personal tax cuts, depreciation reform, investment tax credits, and lower corporate rates. While the resultant ranking, which makes the corporate measures appear as far more efficient supply measures than personal tax reductions, is subject to the specifics of the parameters embodied in the DRI model, it would take very drastic changes in these parameters to upset the conclusions. If we are serious about getting productivity going again, enhancing our international competitiveness and returning the economy to a normal growth path, major changes in taxation of industry must be the initial step.

TABLE 8.—RELATIVE EFFICIENCY OF SUPPLY-SIDE TAX CUTS [1]

	Effect on potential GNP [2]	Effect on core inflation [3]
Personal tax cut	0.16	−0.003
Cut in corporate tax rate	.38	−.021
Increase in investment tax credit	1.60	−.061
Depreciation reform	1.16	−.070

[1] Assumes government purchase offset.
[2] Refined as increase in level of potential GNP or decrease in core inflation rate both per dollar loss of total revenue, for the year 1985.
[3] Change in core inflation rate per billion of tax cut for the year 1985.

This is not to argue that the tax reduction which will surely occur during this recession should be entirely focused on the corporate side. The personal tax burden has risen so rapidly, by over 50 percent on the typical worker in the last 15 years, that equity considerations alone would more than justify early personal tax reductions. Further, there is not much doubt left that a tax burden is discouraging participation in the labor force and affecting productivity adversely. Even if the measured efficiency and augmenting supply is less for the personal tax reduction than for the corporate cuts, a mix of the two is still justified. The 50–50 split between personal and corporate tax reduction recommended in this committee's 1980 report (p. 44) is a sound combination. This leaves room for major tax incentives for investment, as well as providing some meaningful relief for workers. I urge you to focus the personal cuts on the middle brackets of workers, in the $10,000–$25,000 income range, rather than to provide additional relief to the upper-income brackets that gained under the tax reform act of 1978, or the low-income brackets where the burden has been cut very sharply over the last decade.

Concluding comments

The interplay of new ideas with new problems is an exciting undertaking for the economists, legislators, and officials responsible for the development and conduct of economic policy. We are at one of those great moments where the opportunity to reverse the steady slide of our economic system exists, and where new ideas are being offered to accomplish the turnaround. So far, the administration has firmly applied the good old ideas of demand restraint and credit scarcity to create the recession and unemployment necessary to take the immediate inflationary steam out of the economy. Having paid the political price of starting the recession, and making the society pay the human price, the administration and the Congress now have the opportunity to reap the benefits of the recession and apply new ideas to get a solid start on the solution of our long-term problems.

Unfortunately, we must recognize the uncertainty which attaches to the supply side ideas. It would be a gamble with our economic system to go all out with massive supply-side tax cuts which can succeed in accomplishing their goals only if the most extreme values are assumed for the critical supply multipliers.

Under the parameters built into the DRI model, based on a careful, but limited research of the historical record, the contribution of supply side measures is fundamental, but not sufficient to permit disregard of the demand side of the problems. On average, we need a greater degree of demand restraint than we have seen in the last 15 years. Despite the recession, a shift toward fiscal restraint, as measured by the full-employment budget, is still needed.

The scheduled tax increases in a recession environment create the necessity for some stimulative fiscal move. Supply economics dictates that the actions be focused on the tax side. Incentives for industrial capital formation should be at the top of the agenda.

If we provide greater incentives for business to invest and greater incentives for individuals to work, we can make a good start toward making the 1980's a decade of improvement.

TABLE A-1.—BASE, FULL RESOURCE UTILIZATION

	1981	1982	1983	1984	1985
GNP and its components (billions of dollars—SAAR):					
Total consumption	1,899.5	2,129.1	2,387.6	2,681.4	2,989.7
Nonres. fixed investment	302.0	341.4	397.1	458.6	515.1
Res. fixed investment	115.5	167.7	202.0	230.1	238.2
Inventory investment	15.1	24.0	31.3	40.4	38.5
Net exports	−2.1	−16.1	−25.0	−31.9	−34.3
Federal purchases	268.3	286.5	341.9	429.6	501.0
State and local Govenment purchases	369.2	414.6	474.0	538.7	603.6
Gross national product	2,967.6	3,347.3	3,808.9	4,346.9	4,851.8
Real GNP (1972 dollars)	1,484.6	1,534.2	1,604.5	1,678.7	1,722.4
Prices and wages (annual rates of change):					
Implicit price deflator	10.1	9.1	3.8	9.1	8.8
CPI—All urban consumers	10.4	9.8	9.2	8.6	8.3
Producer price index—Finished goods	13.0	11.0	8.9	8.7	8.8
Compensation per hour	11.1	10.9	11.0	10.7	10.2
Core inflation	9.7	9.9	10.2	10.1	10.0
Production and other key measures:					
Industrial production (1967=1 million)	1.567	1.646	1.763	1.881	1.916
Annual rate of change	4.9	5.0	7.1	6.7	1.9
Housing starts (million units)	1.547	1.988	2.146	2.155	1.906
Retail unit car sales (million units)	10.9	11.3	11.6	11.8	11.7
Unemployment rate percent	6.8	6.2	6.0	5.9	5.7
Federal budget surplus (NIA)	−12.5	8.3	4.2	11.1	−13.4
Money and interest rates:					
Money supply (M-1A)	406.0	424.3	454.1	490.5	628.8
Annual rate of change	4.7	4.5	7.0	8.0	7.8
New AA corporate utility rate percent	11.33	10.86	11.46	11.66	11.56
New high-grade corporate bond rate percent	10.86	10.44	11.02	11.21	11.11
Federal funds rate percent	9.91	9.69	9.39	10.10	10.61
Prime rate percentage	11.81	11.32	11.60	12.43	13.29
Incomes (billions of dollars):					
Personal income	2,423.1	2,725.1	3,086.2	3,511.4	3,937.1
Real disposable income (percent change)	1.6	2.3	3.6	4.2	2.9
Saving rate (percent)	3.8	3.6	4.1	4.7	4.8
Profits before tax	272.2	304.0	363.4	433.0	457.9
Profits after tax	163.8	182.6	218.0	259.3	273.8
4-quarter percent change	8.1	11.5	19.4	18.9	5.6
Composition of real GNP (annual rates of change):					
Gross national product	3.4	3.3	4.6	4.6	2.6
Final sales	3.1	3.1	4.5	4.6	2.7
Total comsumption	1.6	2.5	3.1	3.6	2.8
Nonres. fixed investment	−2.7	2.6	6.1	4.8	2.3
Equipment	−1.1	3.2	6.5	5.0	2.4
Nonres. construction	−5.7	1.5	5.1	4.2	2.1
Res. fixed investment	8.7	29.2	8.5	2.9	−6.1
Exports	4.0	5.1	6.2	3.5	1.6
Imports	−1.7	5.3	.4	5.6	2.7
Federal Government	20.8	−1.7	9.7	16.0	8.4
State and local governments	−.4	3.7	4.5	3.1	1.9

TABLE A–2.—30 PERCENT PERSONAL TAX CUT, APPLIED TO FULL RESOURCE UTILIZATION BASE

	1981	1982	1983	1984	1985
GNP and its components (billions of dollars—SAAR):					
Total consumption	1,918.9	2,189.7	2,515.2	2,882.1	3,274.2
Nonres. fixed investment	305.9	355.1	426.9	502.9	570.5
Res. fixed investment	115.8	168.6	201.4	224.1	228.2
Inventory investment	16.6	30.8	40.4	48.0	39.6
Net exports	−3.8	−23.1	−40.2	−54.3	−56.0
Federal purchases	268.5	287.9	346.6	441.5	523.4
State and local Government purchases	369.5	418.1	486.2	564.8	643.8
Gross national product	2,991.5	3,427.1	3,976.6	4,608.6	5,223.7
Real GNP (1972 dollars)	1,495.2	1,562.4	1,648.6	1,723.2	1,766.5
Prices and wages (annual rates of change):					
Implicit price deflator	10.2	9.6	10.0	10.9	10.6
CPI—All urban consumers	10.5	10.2	10.2	10.2	10.0
Producer price index—Finished goods	13.1	11.6	10.5	11.5	11.4
Compensation per hour	11.2	11.5	12.4	12.4	12.3
Core inflation	9.7	9.3	10.2	10.6	11.0
Production and other key measures:					
Industrial production (1967=1)	1.585	1.693	1.830	1.933	1.952
Annual rate of change	6.1	6.8	8.1	5.6	1.0
Housing starts (million units)	1.548	1.972	2.054	1.924	1.641
Retail unit car sales (million units)	11.2	11.9	12.6	12.9	12.8
Unemployment rate (percent)	6.3	5.1	4.7	5.0	4.9
Federal budget surplus (NIA)	−37.2	−44.9	−93.1	−107.2	−160.2
Money and interest rates:					
Money supply (M–1A)	408.8	423.9	471.2	515.4	562.2
Annual rate of change	5.4	5.9	8.8	9.4	9.1
New AA corporate utility rate (percent)	11.45	11.44	12.45	12.81	12.89
New high-grade corporate bond rate (percent)	10.97	11.00	11.96	12.31	12.38
Federal funds rate (percent)	9.97	10.08	10.42	11.86	12.43
Prime rate (percent)	11.76	11.98	12.32	14.01	15.08
Incomes (billions of dollars):					
Personal income	2,436.3	2,776.5	3,207.1	3,724.1	4,249.8
Real disposable income (percent change)	3.7	4.9	6.5	4.8	3.1
Saving rate (percent)	4.8	5.7	7.3	8.1	8.1
Profits before tax	279.9	326.0	405.9	488.8	519.9
Profits after tax	168.3	195.9	243.5	292.7	310.8
4-quarter percent change:	11.0	16.4	24.3	20.2	6.2
Composition of real GNP (annual rates of change):					
Gross national product	4.1	4.5	5.5	4.5	2.5
Final sales	3.7	4.1	5.4	4.5	2.8
Total consumption	2.6	3.9	4.6	3.9	3.0
Nonres. fixed investment	−1.5	4.7	7.9	4.1	.6
Equipment	−.1	5.1	7.9	3.9	.1
Nonres. construction	−4.5	4.0	7.8	4.6	1.6
Res. fixed investment	8.9	28.8	6.3	−1.8	−9.5
Exports	4.0	4.8	5.5	2.2	1.4
Imports	−.9	7.2	7.2	5.2	.1
Federal Government	20.8	−1.7	9.7	16.0	8.4
State and local governments	−.3	4.0	5.2	3.7	2.1

TABLE A-3.—BASE, SLACK ECONOMY

	1981	1982	1983	1984	1985
GNP and its components (billions of dollars—SAAR):					
Total consumption	1,916.5	2,144.8	2,392.9	2,665.4	2,942.2
Nonres. fixed investment	317.2	340.9	366.6	414.7	448.5
Res. fixed investment	111.8	148.3	176.7	205.5	216.0
Inventory investment	16.1	12.0	19.0	31.8	24.8
Net exports	25.6	30.9	34.4	49.4	80.8
Federal purchases	224.6	196.1	276.6	329.3	374.1
State and local government purchases	376.0	419.6	475.5	526.7	584.8
Gross national product	2,987.7	3,292.6	3,741.9	4,222.8	4,671.3
Real GNP (1972 dollars)	1,485.2	1,494.2	1,555.3	1,605.7	1,624.9
Prices and wages (annual rates of change):					
Implicit price deflator	10.7	9.5	9.2	9.4	9.2
CPI—All urban consumers	10.6	10.0	9.7	9.1	8.9
Producer price index—Finished goods	13.2	11.2	9.1	8.8	8.9
Compensation per hour	11.7	11.6	12.4	11.9	11.6
Core inflation	9.7	9.8	9.9	10.0	10.0
Production and other key measures:					
Industrial production (1967=1)	1.580	1.563	1.668	1.777	1.787
Annual rate of change	5.7	−1.1	6.7	6.5	0.6
Housing starts (million units)	1.433	1.642	1.758	1.821	1.653
Retail unit car sales (million units)	10.7	10.5	10.4	10.4	9.9
Unemployment rate (percent)	7.2	7.0	7.0	7.3	7.5
Federal budget surplus (NIA)	18.7	65.3	26.9	47.5	29.6
Money and interest rates:					
Money supply (M-1A)	404.3	413.8	435.7	461.0	493.3
Annual rate of change	4.3	2.3	5.3	5.8	7.0
New AA corporate utility rate (percent)	11.24	10.67	11.01	11.06	10.78
New high-grade corporate bond rate (percent)	10.78	10.26	10.60	10.63	10.37
Federal funds rate (percent)	12.21	13.41	12.26	13.02	14.08
Primary rate (percent)	13.13	14.67	13.61	13.85	14.73
Income (billions of dollars):					
Personal income	2,436.5	2,708.5	3,070.1	3,461.3	3,856.2
Real disposal income (percent change)	1.9	1.1	3.2	2.9	1.8
Saving rate (percent)	3.5	2.5	3.6	4.3	4.8
Profits before tax	278.6	270.0	320.5	377.2	392.3
Profits after tax	167.6	168.4	198.9	233.4	242.6
4-quarter percent change	11.5	0.5	18.1	17.3	4.0
Composition of real GNP (annual rates of change):					
Gross national product	3.6	0.6	4.1	3.2	1.3
Final sales	3.0	.8	4.0	3.0	1.5
Total consumption	2.1	2.2	2.0	2.1	1.3
Nonres. fixed investment	1.5	−1.9	−1.3	3.6	−.3
Equipment	4.2	0	−.4	4.3	.2
Nonres. construction	−3.9	−6.1	−3.3	2.8	−1.7
Res. fixed investment	4.7	18.7	6.3	5.0	−4.7
Exports	18.4	3.0	6.8	6.6	4.2
Imports	.3	1.2	3.8	4.6	.1
Federal Government	4.4	−20.7	28.9	9.1	4.3
State and local governments	.8	2.9	3.5	.7	1.2

TABLE A-4.—30 PERCENT TAX CUT, APPLIED TO SLACK ECONOMY BASE

	1981	1982	1983	1984	1985
GNP and its components (billions of dollars—SAAR):					
Total consumption	1,935.6	2,202.4	2,508.7	2,843.0	3,190.0
Nonres. fixed investment	321.7	357.5	403.9	474.1	520.1
Res. fixed investment	112.1	150.4	177.1	200.8	209.1
Inventory investment	17.9	18.8	28.7	41.4	28.8
Net exports	22.3	19.0	13.0	23.7	58.21
Federal purchases	224.6	195.6	278.4	333.3	382.3
State and local government purchases	376.3	422.1	485.1	549.0	618.6
Gross national product	3,010.5	3,365.8	3,895.0	4,465.0	5,007.1
Real GNP (1972 dollars)	1,495.7	1,522.4	1,603.7	1,661.8	1,688.2
Prices and wages (annual rates of change):					
Implicit price deflator	10.8	9.9	9.8	10.7	10.4
CPI—All urban consumers	10.7	10.2	10.3	10.2	10.0
Producer price index—Finished goods	13.4	11.8	10.1	10.9	10.7
Compensation per hour	11.8	12.0	13.3	13.0	13.0
Core inflation	9.7	9.7	9.9	10.2	10.6
Production and other key measures:					
Industrial production (1967=1)	1.598	1.612	1.749	1.860	1.860
Annual rate of change	7.0	0.9	8.5	6.3	0
Housing starts (million units)	1.436	1.636	1.711	1.667	1.491
Retail unit car sales (million units)	11.0	11.1	11.3	11.5	11.2
Unemployment rate (percent)	6.9	6.0	5.8	6.4	6.2
Federal budget surplus (NIA)	−6.5	12.4	−66.7	−57.6	−92.1
Money and interest rates:					
Money supply (M–1A)	407.2	422.2	452.4	484.7	524.8
Annual rate of change	5.0	3.7	7.2	7.1	8.3
New AA corporate utility rate (percent)	11.21	10.54	10.84	11.05	11.07
New high-grade corporate bond rate (percent)	10.75	10.14	10.43	10.63	10.65
Federal funds rate (percent)	12.28	13.74	12.94	14.25	15.46
Prime rate (percent)	13.08	14.74	13.98	15.00	16.32
Incomes (billions of dollars):					
Personal income	2,447.5	2,750.6	3,166.5	3,639.5	4,121.1
Real disposable income (percent change)	3.9	3.5	5.9	3.9	2.4
Saving rate (percent)	4.5	4.4	6.6	7.5	7.9
Profits before tax	288.1	295.2	370.1	442.8	456.4
Profits after tax	173.3	183.3	229.2	273.5	281.9
4-quarter percent change	15.3	6.0	24.7	19.3	3.1
Composition of real GNP (annual rates of change):					
Gross national product	4.3	1.8	5.3	3.6	1.6
Final sales	3.7	1.8	5.2	3.4	1.9
Total consumption	3.0	3.6	3.5	2.8	1.8
Nonres. fixed investment	2.7	.8	2.4	5.1	−1.0
Equipment	5.4	2.4	2.6	5.2	−.9
Nonres. construction	−2.5	−2.7	1.8	5.0	−1.2
Res. fixed investment	4.9	18.6	4.9	.7	−6.8
Exports	10.3	2.7	6.7	5.8	4.1
Imports	1.2	3.2	5.7	4.8	−1.9
Federal Government	4.4	−20.7	28.9	9.1	4.3
State and local governments	.8	3.1	4.2	1.6	1.7

TABLE A-5.—30 PERCENT PERSONAL TAX CUT, OFFSET BY REDUCED FEDERAL SPENDING

	1981	1982	1983	1984	1985
GNP and its components (billions of dollars—SAAR):					
Total consumption	1,913.1	2,166.0	2,457.7	2,775.2	3,102.3
Nonres. fixed investment	303.4	345.6	406.0	472.2	533.2
Res. fixed investment	115.7	169.7	208.3	242.5	254.8
Inventory investment	15.5	27.4	37.2	48.1	44.8
Net exports	−2.1	−16.9	−29.6	−44.4	−53.7
Federal purchases	256.7	255.1	281.4	347.6	397.3
State and local government purchases	368.9	414.3	474.1	539.9	605.4
Gross national product	2,971.2	3,361.2	3,835.1	4,381.1	4,884.1
Real GNP (1972 dollars)	1,486.4	1,541.0	1,618.7	1,701.1	1,750.3
Prices and wages (annual rates of change):					
Implicit price deflator	10.1	9.1	8.6	8.7	8.4
CPI—All urban consumers	10.4	9.7	9.0	8.2	8.0
Producer price index—Finished goods	13.0	11.0	9.9	8.5	8.5
Compensation per hour	11.1	10.8	10.9	10.5	10.0
Core inflation	9.7	9.7	9.8	9.6	9.5
Production and other key measures:					
Industrial production (1967=1)	1.572	1.662	1.795	1.928	1.974
Annual rate of change	5.2	5.7	8.0	7.4	2.4
Housing starts (million units)	1.553	2.036	2.269	2.359	2.124
Retail unit car sales (million units)	11.0	11.6	12.3	13.0	13.1
Unemployment rate (percent)	6.8	6.2	6.0	5.8	5.7
Federal budget surplus (NIA)	−32.8	−32.6	−61.5	−54.5	−82.0
Money and interest rates:					
Money supply (M–1A)	407.4	429.0	464.3	506.4	549.7
Annual rate of change	5.0	5.3	8.2	9.1	8.5
New AA corporation utility rate (percent)	11.21	10.50	10.80	10.79	10.60
New high-grade corporation bond rate (percent)	10.74	10.10	10.39	10.38	10.20
Federal funds rate (percent)	9.81	9.27	8.65	9.15	9.80
Prime rate (percent)	11.71	11.49	11.04	11.82	12.87
Incomes (billions of dollars):					
Personal income	2,423.7	2,730.0	3,096.3	3,525.7	3,949.2
Real disposable income (percent change)	3.4	4.3	5.8	4.8	3.2
Saving rate (percent)	4.7	5.3	6.4	6.8	6.7
Profits before tax	274.6	311.1	375.8	448.0	472.5
Profits after tax	165.2	186.9	225.4	268.3	282.5
4-quarter percent change	9.0	13.1	20.6	19.0	5.3
Composition of real GNP (annual rates of change):					
Gross national product	3.5	3.7	5.0	5.1	2.9
Final sales	3.2	3.4	4.9	5.0	3.1
Total consumption	2.3	3.6	4.5	4.3	3.4
Nonres. fixed investment	−2.2	3.5	7.3	5.8	3.2
Equipment	−.7	4.1	7.8	6.1	3.3
Nonres. construction	−5.3	2.2	6.2	5.1	2.8
Res. fixed investment	8.9	30.6	10.7	5.4	−4.3
Exports	4.0	5.2	6.3	3.5	1.6
Imports	−1.4	6.0	6.5	6.3	2.8
Federal Government	15.6	−8.4	1.7	14.5	6.3
State and local governments	−.4	3.8	4.8	3.6	2.4

TABLE A-6.—30-PERCENT PERSONAL TAX, OFFSET BY REDUCED MONETARY EXPANSION

	1981	1982	1983	1984	1985
GNP and its components (billions of dollars—SAAR):					
Total consumption	1,909.5	2,156.6	2,437.4	2,745.7	3,060.8
Nonres. fixed investment	302.0	341.7	397.1	457.6	511.6
Res. fixed investment	108.9	149.2	168.4	186.6	190.9
Inventory investment	15.3	25.5	34.0	44.4	41.5
Net exports	−1.2	−13.3	−21.9	−33.0	−40.8
Federal purchases	268.3	236.1	340.4	425.7	494.0
State and local government purchases	367.1	410.5	468.8	533.3	595.7
Gross national product	2,969.9	3,356.1	3,824.1	4,360.3	4,853.77
Real GNP (1972 dollars)	1,486.2	1,540.5	1,617.6	1,698.1	1,745.2
Prices and wages (annual rates of change):					
Implicit price deflator	10.1	9.0	8.5	8.6	8.3
CPI—All urban consumers	10.4	9.6	9.0	8.2	8.0
Producer price index—Finished goods	13.0	10.9	8.7	8.3	8.4
Compensation per hour	11.1	10.9	10.9	10.5	9.9
Core inflation	9.7	9.7	9.9	9.7	9.6
Production and other key measures:					
Industrial production (1967=1)	1.566	1.645	1.762	1.882	1.917
Annual rate of change	4.8	5.1	7.1	6.8	1.9
Housing starts (million units)	1.385	1.671	1.645	1.631	1.442
Retail unit car sales (million units)	10.8	11.2	11.6	12.1	12.1
Unemployment rate (percent)	6.8	6.2	6.0	5.8	5.7
Federal budget surplus (NIA)	−46.1	−68.7	−130.7	−149.2	−203.2
Money and interst rates:					
Money supply (M-1A)	404.7	418.8	444.3	475.2	506.5
Annual rate of change	4.3	3.5	6.1	6.9	6.6
New AA corporate utility rate (percent)	11.45	11.03	11.53	11.52	11.36
New high-grade corporate bond rate (percent)	10.98	10.61	11.09	11.07	10.92
Federal funds rate (percent)	11.77	13.60	14.60	15.36	16.93
Prime rate (percent)	13.03	13.94	14.58	15.16	16.75
Incomes (billions of dollars):					
Personal income	2,425.6	2,734.7	3,105.9	3,540.0	3,972.9
Real disposable income (percent change)	3.4	4.4	6.0	4.9	3.5
Saving rate (percent)	4.9	5.9	7.5	8.1	8.3
Profits before tax	272.5	305.7	366.6	435.3	458.8
Profits after tax	164.0	183.6	219.9	260.7	274.3
4-quarter percent change	8.2	12.0	19.7	18.5	5.2
Composition of real GNP (annual rates of change):					
Gross national product	3.5	3.7	5.0	5.0	2.8
Final sales	3.2	3.4	4.9	4.3	2.9
Total consumption	2.1	3.3	4.1	4.1	3.1
Nonres. fixed investment	−2.6	2.9	6.3	5.0	2.2
Equipment	−1.2	3.4	6.6	5.1	2.1
Nonres. construction	−5.5	1.9	5.7	4.8	2.5
Res. fixed investment	2.7	22.3	2.3	.5	−6.7
Exports	4.0	5.0	6.0	3.3	1.5
Imports	−1.6	5.5	6.0	6.2	3.3
Federal Government	20.8	−1.7	9.7	16.0	8.4
State and local governments	−.9	3.3	4.7	3.6	1.9

67-052 O - 81 - 6

TABLE A-7.—INCREASE IN INVESTMENT TAX CREDIT APPLIED TO FULL RESOURCES UTILIZATION BASE

	1981	1982	1983	1984	1985
GNP and its components (billions of dollars—SAAR):					
Total consumption	1,900.6	2,130.6	2,391.0	2,685.7	2,995.1
Nonres. fixed investment	303.8	353.7	417.8	483.8	546.7
Res. fixed investment	115.5	168.0	202.2	229.4	237.7
Inventory investment	15.4	25.5	33.0	41.9	40.8
Net exports	−2.4	−18.2	−28.3	−35.1	−36.8
Federal purchases	268.0	272.7	325.2	414.9	488.1
State and local government purchases	368.2	414.8	474.4	538.9	603.6
Gross national product	2,970.1	3,347.0	3,815.3	4,359.4	4,875.2
Real GNP (1972 dollars)	1,485.7	1,534.3	1,607.5	1,685.2	1,735.0
Prices and wages (annual rates of change):					
Implicit price deflator	10.1	9.1	8.8	9.0	8.6
CPI—All urban consumers	0.4	9.8	9.2	8.4	8.2
Producer price index—Finished goods	13.0	11.0	9.0	8.6	8.6
Compensation per hour	11.1	10.8	11.0	10.7	10.2
Core inflation	9.5	9.5	9.7	9.7	9.6
Production and other key measures:					
Industrial production (1967=1)	1.573	1.661	1.788	1.908	1.952
Annual rate of change	5.3	5.6	7.6	6.7	2.3
Housing starts (million units)	1.564	1.994	2.145	2.145	1.909
Retail unit car sales (million units)	11.0	11.4	11.6	11.9	11.9
Unemployment rate (percent)	6.3	6.2	6.0	5.8	5.6
Federal budget surplus (NIA)	−21.8	11.0	10.8	16.9	−5.6
Money and interest rates:					
Money supply (M-1A)	406.1	424.2	456.1	494.6	536.0
Annual rate of change	4.7	4.5	7.5	8.5	8.4
New AA corporate utility rate (percent)	11.38	10.87	11.44	11.62	11.50
New high-grade corporate bond rate (percent)	10.91	10.45	11.00	11.17	11.05
Federal funds rate (percent)	9.92	9.68	9.39	10.04	10.47
Prime rate (percent)	11.71	11.85	11.91	12.83	13.65
Incomes (billions of dollars):					
Personal income	2,425.3	2,725.9	3,092.6	3,522.0	3,953.9
Real disposable income (percent change)	1.7	2.2	3.8	4.4	3.1
Saving rate (percent)	3.8	3.6	4.1	4.8	5.0
Profits before tax	273.1	304.7	364.0	431.5	456.4
Profits after tax	174.8	194.4	230.1	270.0	283.9
4-quarter percent change	15.3	11.2	18.4	17.4	5.1
Composition of real GNP (annual rates of change):					
Gross national product	3.5	3.3	4.8	4.8	3.0
Final sales	3.1	3.0	4.7	4.7	3.1
Total consumption	1.6	2.5	3.2	3.5	2.9
Nonres. fixed investment	−2.1	5.9	7.9	5.2	3.1
Equipment	−.4	8.0	9.0	5.5	3.4
Nonres. construction	−5.4	1.6	5.4	4.5	2.6
Res. fixed investment	8.6	29.5	8.4	2.6	−5.8
Exports	4.0	5.2	6.3	3.8	2.0
Imports	−1.6	6.0	5.8	5.4	2.8
Federal Government	20.7	−6.3	9.6	17.9	9.7
State and local governments	−.4	3.7	4.6	3.1	1.9

TABLE A-8.—LIBERALIZED DEPRECIATION, APPLIED TO FULL RESOURCE UTILIZATION BASE

	1981	1982	1983	1984	1985
GNP and its components (billions of dollars—SAAR):					
Total consumption	1,900.0	2,127.7	2,384.9	2,676.8	2,983.7
Nonres. fixed investment	304.1	353.4	418.9	488.2	554.9
Res. fixed investment	115.4	167.1	200.4	227.6	236.3
Inventory investment	15.0	25.2	32.6	41.9	41.1
Net exports	−2.3	−17.4	−26.9	−33.9	−36.2
Federal purchases	268.8	276.4	332.4	422.6	496.1
State and local government purchases	369.0	413.9	472.3	535.8	599.6
Gross national product	2,970.1	3,346.4	3,814.6	4,358.9	4,875.3
Real GNP (1972 dollars)	1,485.7	1,534.1	1,607.5	1,685.4	1,735.5
Prices and wages (annual rates of change):					
Implicit price deflator	10.1	9.1	8.8	9.0	8.6
CPI—All urban consumers	10.4	9.8	9.2	8.4	8.2
Producer price index—Finished goods	13.0	11.0	9.0	8.6	8.6
Compensation per hour	11.1	10.8	11.0	10.7	10.2
Core inflation	9.5	9.4	9.6	9.5	9.3
Production and other key measures:					
Industrial production (1967=1)	1.567	1.656	1.785	1.910	1.956
Annual rate of change	4.9	5.6	7.8	7.0	2.4
Housing starts (million units)	1.544	1.978	2.120	2.125	1.897
Retail unit car sales (million units)	10.9	11.3	11.5	11.8	11.7
Unemployment rate (percent)	6.8	6.2	6.0	5.8	5.7
Federal budget surplus (NIA)	−22.8	6.6	2.6	6.6	−18.0
Money and interest rates:					
Money supply (M–1A)	406.1	424.1	456.6	497.4	542.9
Annual rate of change	4.7	4.4	7.7	8.9	9.1
New AA corporate utility rate (percent)	11.38	10.87	11.43	11.60	11.47
New high-grade corporate bond rate (percent)	10.91	10.46	10.99	11.15	11.03
Federal funds rate (percent)	10.00	9.94	9.66	10.26	10.69
Prime rate (percent)	11.72	11.93	11.97	12.85	13.63
Incomes (billions of dollars):					
Personal income	2,423.9	2,720.8	3,082.8	3,507.3	3,934.3
Real disposable income (percent change)	1.7	2.1	3.7	4.3	3.0
Saving rate (percent)	3.8	3.5	4.1	4.8	4.9
Profits before tax	249.4	263.9	309.4	364.6	374.0
Profits after tax	152.5	155.6	177.7	206.2	206.1
4-quarter percent change	.6	2.0	14.2	16.1	−.1
Composition of real GNP (annual rates of change):					
Gross national product	3.5	3.3	4.8	4.8	3.0
Final sales	3.1	3.0	4.7	4.7	3.1
Total consumption	1.6	2.4	3.1	3.5	2.9
Nonres. fixed investment	−2.0	5.8	8.3	5.9	3.8
Equipment	−.3	7.7	9.6	6.5	4.4
Nonres. construction	−5.3	1.6	5.4	4.5	2.6
Res. fixed investment	8.6	28.9	8.0	2.6	−5.6
Exports	4.1	5.2	6.4	3.7	1.9
Imports	−1.6	5.9	5.8	5.6	3.0
Federal Government	21.0	−5.3	10.6	17.5	9.4
State and local governments	−.4	3.6	4.3	3.0	1.9

Senator BENTSEN. Mr. Evans, we are very pleased to have you. You have been before this committee many times, and we value your testimony. Mr. Evans is president of Evans Economics, Inc.

STATEMENT OF MICHAEL K. EVANS, PRESIDENT, EVANS ECONOMICS, INC., WASHINGTON, D.C.

Mr. EVANS. Thank you very much, Mr. Chairman.

I once again appreciate the opportunity to appear before the Joint Economic Committee. I will summarize my prepared statement briefly.

I would like to cover three topics:

First, the links in the supply side model that I have been developing for the past year.

Second, some of the empirical evidence, since Ms. Rivlin has testified that this evidence is very sparse and I would like to supply some additional figures.

And third, I would like to cover the economic effects of the Kemp-Roth bill with and without offsetting Government spending reductions.

With respect to the supply side model, I think it is useful if I just list briefly some of the linkages which are important. Does everyone have my prepared statement?

Senator BENTSEN. Yes.

Mr. EVANS. I am starting at the bottom of the third page, the numbered statements here. I will go over them very briefly.

Point 1: An increase in the after-tax rate of return on personal saving caused by a reduction of personal income taxes raises the incentives of individuals to save. This increase in saving leads to lower interest rates and higher investment.

Point 2: A reduction in the effective corporate income tax rate—either through lower taxes, higher investment tax credits, or more liberal depreciation allowances—improves capital spending directly by increasing the average rate of return.

Point 3: An increase in both personal and corporate saving leads to greater liquidity and lower loan demand, thereby reducing interest rates. These reductions help both capital spending and residential construction.

Point 4: A rise in the investment ratio leads to higher productivity, which also reduces inflation.

Point 5: A reduction in personal income tax rates leads to a rise in labor force participation and work effort, thereby increasing the supply of labor and raising productivity.

Point 6: Thus, labor supply, capital stock, and productivity are all increased by lower tax rates, raising the maximum productive capacity of the economy and permitting the production of more goods and services.

Point 7: As we increase the productive capacity of the U.S. economy, the shortages and bottlenecks diminish, thereby reducing the rate of inflation.

Point 8: An increase in maximum capacity also permits the production of more goods and services for export markets. This improves our net foreign balance and strengthens the dollar, which in turn leads to lower inflation because imported goods decline in prices.

Point 9: Lower personal income tax rates leads to smaller wage gains, since wage bargaining is based at least in part on the level of after-tax income. Thereby, an across-the-board personal income tax cut would result in lower wage gains and less inflation.

Point 10: Thus lower tax rates cause a reduction in inflation through several channels. Inflationary pressures decline as the gap between actual and maximum potential GNP rises; productivity increases, thereby lowering unit labor costs; the dollar strengthens; and wage rates rise more slowly.

Point 11: Lower inflation leads to higher real disposable income, since bracket creep is mitigated. This rise in income leads to further improvement in consumption, output, and employment.

Point 12: Lower inflation leads to lower interest rates, which stimulates investment in both capital formation and in housing.

Point 13: The increase in demand for goods and services stemming from lower inflation is matched by the rise in maximum potential capacity, thereby resulting in balanced, noninflationary growth.

Let me talk about a few of the parameter estimates, a few of the statistical estimates which we have found in our supply side work.

A 1-percent rise in the after-tax rate of return on saving, occasioned by a tax cut, would increase savings by about $12 billion. This savings would be translated to lower interest rates, and would eventually raise investment by the same amount.

A reduction of 1 percentage point in the personal tax rate would result in an increase in labor-force participation by 0.2 percent, or about 200,000 workers. It would also result in a very substantial increase in the amount of labor offered by those already in the labor force.

For example, a 1-percentage point reduction in tax rates would increase "hours worked," which is voluntary on the part of many workers. It would reduce absenteeism, and it would increase the ability and the willingness of those in the labor market to look for work.

Finally, a 1-percent reduction in the personal income tax rate would reduce wage rate increases by 0.4 percent.

So I think that the results of reduction in personal and corporate income taxes are very strong. They are not only concentrated in the area of investment, which has been incorporated in previous models, but work in labor markets as well.

Now if we put all these results together—skipping over some of my prepared statement here—I consider in some tables toward the end of my prepared statement, and it may be easier to follow the numbers if you have the tables in front of you, three variants of the economy from now until 1985.

Case A simply represents more or less a baseline forecast with no tax cuts at all. This is unlikely to be realized. I think everybody expects some sort of tax cut next year, but this is a useful starting point.

Suppose we didn't have any tax cut. Suppose that we had an average growth of GNP of 3 percent a year, plus 9 percent inflation—which is a fairly conservative assumption.

If that were to be followed, we would have a surplus beginning in 1983. We would have an eventual decline of the unemployment rate to about 6 percent in 1985. So that is the baseline case: No further tax cuts.

Now we consider the Kemp-Roth bill—that was a very timely appearance, Senator——

Representative BROWN. Now that he is here, call it the Roth-Kemp. [Laughter.]

Mr. EVANS. Roth-Kemp. I'm sorry. I don't know how I could have done that. [Laughter.]

Well, I also speak of the Roth-Armstrong bill, so we are covered on all bases.

The Roth-Kemp bill in its original form simply was a 10-percent across-the-board reduction in personal income taxes for 3 years, or a total of 30 percent.

Now case B gives some numbers that are associated with that tax cut. We have a reduction in taxes of about $115 billion by the third year, but we have to adjust that for the reflow—the fact that the economy grows somewhat faster. Therefore, we end up with a maximum deficit of $62 billion in 1983, and a deficit of $10 billion in 1985.

We now compare this with case C, which is very close to the Roth-Armstrong bill, which contains a 10-percent across-the-board tax cut for 3 years; but also contains a limit on Government spending, so that it remains constant in real terms. It keeps up with the rate of inflation, but it does not increase.

We find there that the budget comes into balance in 1984, and is assumed to remain in balance after.

Now those are the three cases I have examined. I think the interesting questions are, of course: What are the effects of these various Government policies on the rate of unemployment and on the rate of inflation?

Now what I have done is to separate out these effects in a table shown in my prepared statement entitled, "Effect on Unemployment and Inflation."

Case B, again the original Roth-Kemp bill, shows the very substantial reduction in unemployment. So that, for example, by 1985 the rate of unemployment is reduced 2.4 percent, bringing it down to 3.7 percent.

Now we have to measure the effect of inflation of this tax cut. What I have done here is to divide that into "demand side" and "supply side."

The demand-side effect suggests that as you move the economy closer to full employment and full capacity, you have an effect of raising prices.

The supply side effect, which stems from lowering tax rates, improving labor participation, productivity, and wage rate increases, is a negative.

So we find that on balance the effect of the original Roth-Kemp bill would be to raise inflation by 1.8 percent by 1985.

We now contrast this with the Roth-Armstrong bill, which as I have already mentioned includes the Roth-Kemp tax cut but also holds Government spending constant in real terms. Here we find that the rate of unemployment is reduced by 1.8 percent by 1985—almost as far as under the Roth-Kemp bill.

However, if we look at the effect of inflation, we see a much different picture.

First of all, we have a smaller demand-side effect because the rate of unemployment has not declined as rapidly.

Second, we have a supply side effect from less Government spending because resources have been shifted from the public to the private sector, thereby raising productivity.

And finally, we have the same supply side effect from the reduction in tax rates. since we are talking about the same reduction in tax rates.

As a result, the total price level is some 5 percent lower by 1985, and the rate of inflation on an annual basis has been reduced by approximately 2 percent.

Thus, we see that the new supply side model results draw a sharp distinction between across-the-board tax cuts which are not offset by Government spending, and tax cuts which are offset.

Therefore, it is impossible to draw a blanket statement that says tax cuts are inflationary or anti-inflationary. It depends not only on the type of tax cuts, but it depends on the combination of fiscal and monetary policies which are usually associated with the tax cuts.

So in conclusion, as far as the recommendations that I personally would favor as far as fiscal policy:

I believe that an across-the-board tax cut, which is coupled with limits on Government spending such as the ones I have described—no increase in real terms until the budget is balanced—would appear to me to be an optimal method of fiscal policy for the next several years.

Thank you, Mr. Chairman.

Senator BENTSEN. Thank you very much, Mr. Evans.

[The prepared statement of Mr. Evans follows:]

PREPARED STATEMENT OF MICHAEL K. EVANS

New Developments in Econometric Modeling: Supply Side Economics

For the past fifteen years the economic situation in the United States has been worsening. The average rate of inflation for the period from 1948 to 1965 was 2 percent; today it is close to 10 percent. Productivity increased at an average rate of 3 percent over that period; today it is stagnant or declining. Unemployment is far higher than it was during the 1950's and 1960's, while the maximum potential growth rate of the economy has slowed from 3.5 percent to 2.7 percent. The dollar, once the foundation of international commerce, has been chronically weak for over a decade.

The underlying cause of these problems has been a shift in resource allocation from investment to consumption, both private and public. For the past fifteen years, fiscal and monetary policies have tilted in the direction of subsidizing consumption and penalizing investment. We have had tax cuts, rebates, and a huge increase in the proportion of national resources devoted to transfer payments. When these pump-priming policies lead to excess demand, monetary policy is then invoked to reduce investment and cause a recession. This vicious cycle has led to an ever-increasing rate of inflation since 1965, with the end nowhere in sight.

To a certain extent, this cycle has been fueled by political considerations. Tax cuts for lower-income individuals are easier to defend than tax cuts for businesses. Rebates are more "equitable" than tax cuts for upper-income taxpayers, particularly those who save enough that they do not "need" further tax reduction. Increased social welfare benefits can be defended on the grounds that they reduce the suffering of the poor, the ill, and the aged. Furthermore, personal income tax cuts and transfers affect the economy with a shorter lag than do business tax cuts.

However, another reason that demand-oriented policies have been used almost exclusively in the past 15 years is that all of the current large scale econometric models have indicated that these policies will have a more beneficial effect on the economy than will supply side cuts. Embedded in these models is the im-

plicit assumption that an increase in demand will automatically "trickle down" to increase aggregate supply, thus insuring balanced, noninflationary growth.

However, there is nothing magical about the balance between aggregate demand and supply. If incentives are lacking for investment, capital formation will stagnate. If incentives are lacking for labor, labor force participation will decline, the amount of labor offered by those already in the labor force will be reduced, and productivity will diminish. As a result, total productive capacity of the economy will grow more slowly than total demand, and bottlenecks, shortages and higher inflation will eventually result.

According to Keynesian demand economics, this higher inflation must then be fought by causing a recession and reducing aggregate demand. It is true that the gap between aggregate demand and supply must be widened in order to diminish inflationary pressures. However, surely there are two ways to accomplish this same aim. One is indeed to diminish demand, thereby causing higher unemployment. The other is to increase aggregate supply, thereby raising the production possibility curve of the economy and increasing jobs and output at the same time that inflation is being lowered. This is the fundamental hypothesis underlying our supply-side modeling.

As already noted, most fiscal policy analysis of the past 15 years has been based on the belief that an increase in government spending will lead to a larger rise in demand and output than an equivalent reduction in taxes. The reasoning which leads to this conclusion is straightforward if inaccurate. If the government increases its spending, the entire dollar is used to raise aggregate demand. If taxes are cut, however, some of each dollar is used for saving. Since existing Keynesian models do not incorporate the links between saving and investment, demand does not rise as much.

Furthermore, these models also state that a personal income tax cut has a larger effect than a corporate income tax cut, and for much the same reason. Individuals spend a larger proportion of the extra money they receive from reduced taxes than do corporations, and that left-over saving does not contribute to economic growth or prosperity.

The supply-side model which we have built gives exactly the opposite result: an income tax cut has a larger effect on the economy than an increase in government spending. The supply-side mechanisms which support this conclusion can be qualitatively summarized as follows. In particular, a reduction in personal and corporate income taxes will set in motion the following chain of events.

1. An increase in the aftertax rate of return on personal saving occasioned by a reduction in personal income tax rates raises the incentives of individuals to save. This increase in saving leads to lower interest rates and higher investment.

2. A reduction in the effective corporate income tax rate, either through lower tax rates, a higher investment tax credit, or more liberal depreciation allowances, improves capital spending directly by increasing the average rate of return.

3. An increase in both personal and corporate savings leads to greater liquidity and less loan demand, thereby lowering interest rates. These effects help both capital spending and residential investment.

4. A rise in the ratio of investment to GNP leads to higher productivity, which means that more goods and services can be produced per unit of input. As a result, unit costs do not rise as fast and inflation grows more slowly.

5. A reduction in personal income tax rates leads to a rise in labor force participation and work effort, thereby increasing the supply of labor necessary to produce more goods and services.

6. Thus labor supply, capital stock, and productivity are all increased by lower tax rates, thereby expanding the maximum productive capacity of the U.S. economy.

7. As a result of higher maximum capacity the inflationary pressures of shortages and bottlenecks diminish, thereby reducing the rate of inflation.

8. An increase in maximum capacity also permits the production of more goods and services for export markets. This improves our net foreign balance and strengthens the dollar, thus leading to lower inflation because imported goods decline rather than advance in price.

9. Lower personal income tax rates leads to smaller wage gains, since wage bargaining is based at least in part on the level of aftertax income. This in turn reduces inflation further.

10. Thus lower tax rates cause a reduction in inflation through several channels. Inflationary pressures decline as the gap between actual and maximum po-

tential GNP rises; productivity increases, thereby lowering unit labor costs; the dollar strengthens, causing less imported inflation; and wage rates rise more slowly.

11. Lower inflation leads to higher real disposable income, since bracket inflation is mitigated. The rise in income leads to an increase in consumption, output and employment.

12. Lower inflation leads to lower interest rates, stimulating investment in both plant and equipment and in housing.

13. The increased demand for goods and services stemming from lower inflation is matched by the rise in the maximum potential capacity of the economy to produce these goods and services, thereby resulting in balanced, noninflationary growth.

We now comment briefly on the empirical evidence contained in the supplyside model for each one of these links.

The vast majority of previous empirical work on the consumption function implies that the interest rate has no significant effect on the proportion of disposable income which is consumed or saved. It is true that a simple correlation between the saving rate and the interest rate reveals no relationship. However, we have found a very strong link between the real aftertax rate of return and personal saving. After substantial testing, we have determined that this rate can best be represented by the long-term bond yield multiplied by (1—average tax rate on personal income) minus the average rate of inflation over the past four years. Thus defined, this rate of return is found to have an important effect on consumption and saving. Specifically, a 1 percent increase in the rate of return—e.g., from 3 percent to 4 percent—would raise saving by $12 billion. Furthermore, we find that the importance of the aftertax rate of return on saving has been increasing in recent years as interest rates and inflation move to higher levels.

An across-the-board $10 billion personal income tax cut from, say, 30 percent to 29 percent would have relatively little effect on saving over and above the increase stemming from higher income, although as we note later it would have a much larger effect on labor market behavior. However, the increase in saving from this tax cut due to the increased rate of return would be only about $1 billion. On the other hand, a tax cut of the same size which was targeted only to increase saving through a higher rate of return would result in a rise in saving of some $13 billion. Thus the form of the tax cut is all-important in determining the effect on consumption and saving.

Unlike the results of personal saving, existing econometric models already incorporate some positive relationship between increases in the rate of return on investment and capital spending. These increases can occur either through a decline in interest rates, a rise in stock prices, a reduction in the corporate income tax, an increase in the investment tax credit, more favorable treatment of depreciation allowances, or other tax benefits not specifically incorporated in our supply-side model. Where existing models have been deficient is in their inability to link changes in saving and investment, and changes in investment to productivity and economic growth.

Our results indicate that a $1 billion increase in aftertax profits, whether this occurs from a cut in income tax rates, an increase in the investment tax credit, or a reduction in depreciation lives, will raise fixed business investment by about $0.7 billion. We also found that a decline in interest rates by 1 percentage point—e.g., from 9 percent to 8 percent—would raise investment by $1.4 billion, while the increase in stock prices resulting from lower interest rates would raise investment by an additional $2.1 billion.

One of the most important sets of linkages in the supply-side model is the relationship between saving and investment. For if saving rises but these funds are just used to increase idle cash balances, investment may not expand. However, these links are well documented in our model.

A $10 billion increase in personal saving raises time deposits by $3.0 billion and thrift institution deposits by $1.6 billion. In addition, it reduces loan demand by $3.6 billion.

As a result of these changes in the balance sheet of commercial banks, demand for U.S. Government securities by the banks increases by $11.5 billion. This results in approxiamtely a 1 percent decline in interest rates and a 3.2 percent increase in stock market prices.

These changes have two related effects on investment. First, lower interest rates and higher stock prices stimulate fixed business investment. Second, easier credit increases housing starts and mobile homes and, to a lesser extent, producers durable equipment.

As would be expected, nonresidential construction is more sensitive to changes in interest rates and stock prices than is equipment. Thus we find a $2.5 billion increase in structures, compared to a $1.3 billion rise in producers durable equipment from a $10 billion increase in personal swing. Residential construction rises $1.5 billion because of credit easing and $1.2 billion because of lower interest rates. These are, of course, only first-round effects which do not take into account the increase in investment stemming from higher income and output. However, these results do document the strong linkages between savings and investment which exist in the supply-side model. For if these linkages are not strong, the second-round effect will not be observable either.

Another important breakthrough in our supply-side model is the endogenous explanation of productivity, which has heretofore been treated exogenously. In addition to the changes in productivity which occur because of fluctuations in GNP and levels of capacity utilization, we have been able to identify four major factors responsible for the decline in the long-term growth rate of productivity from 3 percent per year during the first twenty years of the postwar period to its present level of approximately 0 percent. Productivity growth is closely tied to the investment ratio, but also depends on several other factors which are enumerated below.

	Reduction caused in annual rate of productivity growth (percent)
1. Decline in the ratio of productive fixed business investment less cars and small trucks to GNP	1
2. Costs of government regulation for pollution abatement, occupational safety and health, consumer product safety, toxic substances control act, and other Federally mandated standards	1
3. Increase in the proportion of secondary workers in the labor force; the average level of training and education of these workers is initially less than for primary workers	½
4. Increase in the relative price of energy	½

We now turn to the effect of changes in tax rates on labor market variables. In addition to the beneficial aspects of tax cuts on saving and investment, we have also found significant relationships between changes in personal income taxes and labor market conditions. These can be subdivided into three areas: labor force participation, amount and quality of work offered, and increase in wage rates.

The results for labor force participation are best divided into primary and secondary members of the work force. The effects on primary workers, defined here as males aged 25 to 54, are significant but small. A one percentage point (p.p.) reduction in the marginal personal income tax rate would result in only a 0.05 percent increase in the primary labor force. However, it would result in a 0.37 percent increase in the secondary labor force. However, total increase in the labor caused by a 1 p.p. reduction in the tax rate would be 0.25 percent, or approximately 270,000 workers at the present size of the labor force.

The labor force participation equations also indicate that a 1 percent increase in the real minimum wage (adjusted for inflation) would decrease labor force participation for those aged 16–25 by 0.2 percent. At the other end of the age scale, a 1 percent increase in real per capita social security benefits would diminish labor force participation of those 55 and over by 0.4 percent.

The equations relating the amount of utilized labor to output capital stock, and productivity are usually known as inverted production functions or labor demand functions. However, they are actually a reduced form of labor demand and supply equations, since the amount of labor used depends both on the demand for labor by business and the degree of willingess to offer that labor.

These combined effects are very significant. We find that a 1 percent increase in the average personal income tax rate including social security taxes will reduce the amount of labor utilized by 0.5 percent. This decline is caused by several factors. First, an increase in the cost of labor through higher social security taxes will reduce the demand. Second, an increase in tax rates will reduce hours worked per week; we find that this effect accounts for slightly over half of the total reduction in labor offered. Third, higher taxes lead to a rise in vacation time, absenteeism, and unwillingness even to work at all by some members of the labor force.

The results we have found on the effect of changes in taxes on work effort are quite striking. Yet they are corroborated by some cross-section studies which we performed for the years 1962 and 1966. These years were chosen because they bracketed the major 1964 tax cut. We used the IRS tapes and stratified the income tax returns by income classification in order to determine what happened to work effort when taxes were reduced.

Basically the approach we have taken is the following. We know that tax rates were reduced significantly between 1962 and 1966. For any given level of adjusted gross income (AGI), we examined what happened to the proportion of income accounted for by the sum of wages and salaries and business and professional income—in other words, income earned from current work effort. If this proportion remained unchanged we could conclude that the reduction in tax rates had no significant influence on work effort. If it increased, however, we could conclude that the tax reduction heightened work effort. Note that by holding AGI constant in the regressions we have automatically excluded any increase in work effort which might have accrued from the overall growth in the economy or rise in productivity. Our analysis is strictly a marginal one for any given level of income.

We found the following results for a 1 percent reduction in tax rates. For lower income workers, such a reduction would raise work effort by about 0.1 percent. For middle and upper-middle workers, the reduction was about 0.25 percent. For upper income workers—those with taxable income of $120,000 or more—we found that the elasticities were in excess of 2.0. The upper income elasticities are probably overstated for the following reason. When the top marginal tax rate dropped from 91 percent to 70 percent, many individuals simply shifted some of their compensation from capital gains and stock options back into earned income. As a result, tax revenues in the top bracket more than doubled from 1964 to 1966 after accounting for growth in the economy even though the top bracket rates dropped drastically.

Even if the upper-income elasticities are overstated, these combined cross-section and time-series show conclusively that work effort is negatively related to the level of taxation. Furthermore, this result is not confined to the lower end of the income spectrum, but is significant at all levels of income and increases as the marginal tax bracket rises.

Hence an increase in tax rates diminishes labor force participation and use of labor by businesses. However, that is not the end of the story. In addition raises the cost of labor by increasing wage rates. We find that a 1 percent increase in tax rates will result in a 0.4 percent increase in wage rates directly and a 0.7 percent increase after including the secondary effects of higher wage rates and unit labor costs on prices. Conversely, a 1 percent decline in tax rates will eventually reduce prices by 0.7 percent because of lower unit labor costs, and even more if we consider the beneficial effects of lower interest rates and other factor prices.

The structure of the supply-side model thus ties the major factors of production—labor, capital, and productivity growth—directly to maximum potential GNP of the U.S. economy. Hence the model does not have to depend on exogenous assumptions about how fast potential GNP will grow in future years; this growth rate is directly related to labor input, capital stock, and productivity.

A 1 percent increase in the amount of labor supplied, assuming no offsetting decline in productivity, will raise potential GNP by ⅔ percent. An increase in investment sufficient to raise the capital stock by 1 percent will raise potential GNP by ⅓ percent; at present levels, this would be about a 10 percent increase in fixed business investment. Such an increase would also raise the investment by 1 percent, which would increase productivity by a further 0.6 percent.

A 1 percent increase in productivity will not only expand maximum potential GNP by that amount; it will initially lower prices by ⅔ percent, since labor costs consist of ⅔ of total factor costs. This is only the first-round effect, since lower prices will lead to lower wages and further declines in unit labor costs and prices. The total effect of a 1 percent increase in productivity is to reduce prices by about 2 percent.

We are also able to introduce other innovations into the supply-side model because of the endogenous treatment of maximum capacity. In particular, the model introduces the concept of the cumulative gap, which we define as the cumulative difference between 99 percent of maximum GNP and the actual level of GNP when this gap is negative. When it is positive—i.e., actual GNP is below maximum potential output—inflationary pressures do not build because of bottle-

necks and shortages. However, when it is negative, prices start to rise faster than would be indicated by the cost of factor inputs alone.

So far this term does not sound greatly different than an index of capacity utilization, although it is much more inclusive in that it covers all sectors of the economy. However, we have cumulated this gap for all periods when the gap is negative. This term therefore indicates that inflationary pressures build up over many years and do not disappear every time a mild recession occurs. The inefficiencies and distortions which occur when the economy is operating near full capacity are not reversed overnight, and remain as a legacy until the cumulative gap once again returns to zero. This term may also represent the gradual buildup of inflationary expectations.

The final area of the model in which supply-side economics has been incorporated is the integration of the international sector with the U.S. economy. Again, this is an area where theoretical economists have long posited strong links, but they have never been empirically documented within the context of a macroeconomic model.

Supply side effects are important in two specific areas. First, an increase in the gap between actual and maximum potential GNP raises exports, since the greater capacity of the U.S. economy permits the production of more goods and services for export markets as well. A 1 percent increase in this gap raises net exports by about $0.7 billion per year; since the gap is cumulative, this figure continues to increase linearly and is, for example, $2.1 billion after three years.

The second major effect is the link between the trade-weighted average of the dollar, which is itself closely tied to the size of the net foreign balance, and the overall rate of inflation. We find that a 10 percent decline in the value of the dollar relative to a trade-weighted average of the Deutschemark, French franc, Belgian franc, Dutch guilder, and Japanese yen raises the producer price index 1.3 percent and the consumer price index about half that much after a period of two years.

Thus we can document several supply-side relationships that have a significant effect on inflation as well as the rate of growth. All these figures refer to the change in the CPI and are impact estimates only. First, a 1 percentage point decline in the personal income tax rate will lower wage rates and thus prices by about 0.5 percent. Second, a 1 percent increase in productivity will lower prices by ⅔ percent. Third, a 10 percent improvement in the trade-weighted average of the dollar will reduce inflation by about 0.6 percent. Fourth, after a three-year period, a 1 percent increase in the gap between actual and maximum GNP will lower prices by 0.4 percent. It is worth repeating that all of these figures are impact estimates only and do not take into account the interaction between wages, prices, productivity, and other factors of production. Indeed, the final changes in prices are between two and three times the initial impacts, depending on cyclical conditions at the time.

Thus we find that the nemesis of demand-side economics, namely that output must be reduced and unemployment increased in order to dampen the rate of inflation, is only one of several alternatives. Inflation can also be reduced by increasing productivity, reducing personal and corporate tax rates, and strengthening the value of the dollar. We would not quarrel with the statement that the size of the gap between actual and maximum potential GNP is one of the factors determining the rate of inflation, but do believe that other factors must be considered as well.

We now use a preliminary version of the supply-side model which we have recently constructed to examine the effects of a 30 percent across-the-board personal income tax cut spread over three years. We consider the following three cases:

1. Baseline case: No further tax cuts. Federal government receipts rise 15 percent per year whereas expenditures rise 12 percent per year, assuming a 9 percent inflation rate and 3 percent average increase in real growth. Under this set of assumptions, the budget first reaches balance in fiscal year 1983 and the surplus grows rapidly thereafter.

2. A 10 percent across-the-board personal income tax cut for each three consecutive years and no offsetting decline in government spending. The Federal budget reaches a peak of —$62 billion in fiscal year 1983 and remains in deficit throughout the 1980–85 period.

3. The same 10 percent across-the-board personal income tax cut for three years, but no increase in government spending in real terms until the budget is balanced, which first occurs in 1984. After that, spending and taxes increase at the same amount. The results are summarized in the Table on the following page.

Fiscal year	Case A			Case B				Case C				Memo— GNP, unemployment for Case A	
	Receipts	Expenditures	Surplus or deficit	Change in receipts due to tax cut	Less: Reflows	Equals: Total receipts	Surplus or deficit	Change in receipts due to expenditure cut	Total receipts	Total expenditure	Surplus or deficit	Amount	Percent
1979	466	494	−28									2,314	5.8
1980	532	569	−37									2,527	6.6
1981	618	638	−20	−29	6	595	−43	−5	590	620	−30	2,783	7.9
1982	711	715	−4	−66	16	661	−54	−11	650	676	−26	3,118	7.3
1983	817	800	17	−115	36	738	−62	−19	719	737	−18	3,402	6.9
1984	940	896	44	−132	48	856	−40	−19	837	837	0	3,911	6.5
1985	1,081	1,004	77	−152	65	994	−10	−22	972	972	0	4,380	6.1

Case A: No further tax cuts, receipts grow 15 percent, expenditures 12 percent per year.
Case B: 10 percent personal income tax cut for 3 years, expenditures grow 12 percent per year.
Case C: Same tax cut, but expenditures grow 9 percent per year until budget is balanced. Underlying economic assumptions after 1980: real growth 3 percent per year, inflation (GNP deflator) 9 percent per year.

EFFECT ON UNEMPLOYMENT AND INFLATION

	Case B					Case C					
			Effect on inflation					Effect on inflation: Demand side/supply side			
	Reduction in unemployment	New unemployment rate	Demand side	Supply side	Total	Reduction in unemployment	New unemployment rate	Less unemployment	Less G	Less T	Total
1981	0.3	7.6	0	0	0	0.1	7.8	0	0	0	0
1982	.9	6.4	+.6	−.3	.3	.3	7.5	.1	−.2	−.3	−.4
1983	1.6	5.3	+1.2	−.9	.3	.7	6.2	.4	−.8	−.9	−1.3
1984	2.0	4.5	+3.5	−2.7	.8	1.3	5.2	1.3	−1.6	−2.7	−3.0
1985	2.4	3.7	+6.6	−4.8	1.8	1.8	4.3	2.3	−2.6	−4.8	−5.1

Even Case B, which is akin to the old Kemp-Roth bill, does not materially worsen the economic situation. While the deficit reaches a peak of $62 billion in fiscal year 1983, the supply-side effects of lower tax rates are substantial. The inflation rate increases only about 1 percent per year faster, although this rate would accelerate were inflation to remain below 4 percent indefinitey. By 1985 the unemployment rate registers only 3.7 percent instead of 6.1 percent as projected in the base line solution.

Case C, which is similar to the recent Roth-Armstrong bill, appears to be far superior. The unemployment rate declines to 4.3 percent by 1985, but the rate of inflation is reduced by about 2 percent per year in 1984 and 1985. Here the effects of higher inflation through lower unemployment are offset not only by the supply side effects of lower tax rates, but the salutory effects of lower government spending as well, which increases productivity by shifting resources from the private to the public sector.

In conclusion, a fiscal policy program which incorporates a 10 percent personal income tax cut for three years in a row and keeps the level of government spending increasing about 3 percent per year in real terms would raise the inflation rate about 1 percent from its current underlying rate of 9 percent to 10 percent per year and would reduce the rate of unemployment by slightly more than 2 percent by 1985. A program which incorporated the same 10 percent tax cut but also limited government spending to the rate of inflation until the Federal budget were balanced would not only reduce the unemployment rate almost 2 percent by 1985 but would also reduce the rate of inflation by approximately 2 percent per year.

Senator BENTSEN. We are very pleased to have Mr. Klein here. He is the chairman of the board of trustees of the Wharton Econometric Forecasting Associates, Inc.

Mr. Klein, if you would proceed with your testimony.

STATEMENT OF LAWRENCE R. KLEIN, CHAIRMAN, BOARD OF TRUSTEES, WHARTON ECONOMETRIC FORECASTING ASSOCIATES, INC., PHILADELPHIA, PA.

Mr. KLEIN. Thank you.

It is gratifying to see such a vigorous debate and enthusiastic turnout for what is a methodological issue in economics. We are not entirely focusing today on the state of the economy, but we are trying to understand how it works and that is all for the good.

I think there is a great misconception that econometric models have neglected supply. As I stated in my prepared statement, when I chose 2 or 3 years ago to make my presidential address to the American Economic Association on the supply side, that choice was based on having worked for 10 years on introducing a full, interindustry—input-output—framework into the Wharton models with 56 different sectors fully delineated.

That really is the heart of supply side modeling—the whole problem of interpreting the energy crisis, the oil embargo, the high rise in oil prices, and limitations on the availability of other natural resources. It is absolutely important and imperative to study the way in which goods flow through the system in the course of production and supply.

I think that sort of work enabled us to interpret the original energy embargo as something that would induce a recession, and, indeed, people tend to have short memories, but that was a very controversial issue in the autumn of 1973: Whether we would have a soft landing or a hard landing—and supply side economics in the Wharton model figured very importantly in our deciding it would not be a soft landing.

The problem that we face is that there is a tendency to identify

supply side economics with tax incentives on worker productivity and worker effort. There probably are some very significant associations between worker effort and tax rates, but the trouble is: We don't know this.

It was a great mistake, I think, for people to jump to conclusions on the effect of capital gains on investment a couple of years ago, and there was very low-quality econometric work done to establish that relationship.

We run a danger that people will jump to conclusions, using anecdotal information and evidence to establish a relationship between the rate of taxation and worker incentive.

That is a very interesting subject. It deserves very careful consideration. And as Ms. Rivlin said, we are asking for frontier decisions of great political significance by tomorrow, before they have run through the appropriate sort of professional investigations.

There is a longstanding argument in economics and it is very difficult to repeal the laws of economics, called the "backward bending supply curve of labor." As Ms. Rivlin pointed out earlier, there are two effects:

As people gain added income, they have a reduced incentive to work to reach certain targets.

And as they have added income at a better rate of taxation, they like the rate of return better.

We have to offset those two. It is not at all clear that the net effect is strongly positive or that the net effect is even positive. That is the sort of thing that requires more careful investigation than has been supplied.

There are many kinds of things in models, particularly on the investment incentives, that show very clearly that improved investment tax credits, improved acceleration, or enhanced acceleration of depreciation, support of R. & D., raise the level of investment, raise the level of productivity, and give us a better performance for the economy overall.

Indeed, that is the kind of scenario worked out in most of the models that shows that we have a situation where we can obtain rising output and lower prices; whereas, the conventional point of view would have rising output and rising prices, looking only at the demand side.

In my prepared statement, I include a table in which we have run through a 20-percent investment tax credit, extending it beyond equipment, to structures, within the framework of the Wharton model. And, indeed, there is a better profile for growth. There is a better profile for inflation. And a better profile for productivity. And all the effects are there in place as they should be.

There is a similar table that shows that the impact of OPEC pricing, or higher world oil prices, works in just the opposite direction. It adds to price pressure. It adds to domestic inflation. And it reduces the rate of growth, and probably slices a bit off the growth in productivity.

So these effects are in the models there. We have had them there for a long time. There is a bit too much loose talk and rhetoric saying the models are all demand-side oriented and they do not contain these effects. They have contained these effects for several years, and indeed we have been arguing along these lines.

An idea was introduced, particularly in Ms. Rivlin's testimony this morning, that in the long run the models lose a great deal of accuracy and cannot be trusted for judgment about longrun multiplier effects, longrun scenario effects.

Now this is certainly a correct interpretation, that the range of error grows as we try to look further into the future, or as we get further from our base of experience. That would hold not only for the long run, but for very big changes—very big changes in taxes, or very big changes in the structure of the economy.

But for the argument on the long run, I would like to try to introduce a concept that is not easy to understand, but I think it is very important.

Namely, that we should look at the discounted value of future decisions, or the present value. We surround our judgments, about the effect of policies, with errors—an up-side error and a down-side error. And as we discount those error bands back to the present to find present value of the error, they contract because of the discount factor, just as our target value of what we have to decide upon contracts.

That is an important issue because we have to make longrun decisions. In the energy issue and in longrun growth policies, we have to make decisions about the year 1990, or the year 2000 or beyond, and any method whatsoever is going to be subject to great error.

Econometric methods will be no more subject to error than other methods. And if the proper rules of discounting are used, we will get as good an answer from an econometric model as we get from any other source, and probably somewhat better.

The supply side content of models does not downplay the role of saving. The role of saving is very important. The key to understanding that is to say that we have to look at balanced policies when we study the effect of changes on the economy, and any balanced policy would certainly want to have higher investment and higher savings to go with the investment. Because if we do not have higher saving, then it will require higher interest rates, higher costs of supplying capital, and that will act as a future depressant on the economy.

On the other hand, the models do show that if we aim for a higher rate of investment in capital formation, and at the same time introduce policies to stimulate savings, we will meet that higher level of investment with the forthcoming saving in an easier way. And that will enable the investment effects to be longer lasting and more fruitful—and the model would show this.

So the thought I want to leave with you is that: Yes, indeed, the models do have supply-side content; they do validate the virtues of saving when they are embedded in the proper kind of policy mix; and they do show that enhanced productivity is probably the best route to dealing with the inflation problem that we have in the next decade or so.

Thank you.

Senator BENTSEN. Thank you very much, Mr. Klein.

[The prepared statement of Mr. Klein follows:]

PREPARED STATEMENT OF LAWRENCE R. KLEIN

The Supply Side of the Economy: A View From the Perspective of the Wharton Model

It is no coincidence that I entitled my Presidential Address to the American Economic Association (December, 1977) "The Supply Side" (printed in the American Economic Review, March, 1978, p. 1–7). That presentation was motivated by the large effort that had been in place all during the 1970's in building a full supply side to the Wharton Model. Nothing could be further from the truth than the charges that mainstream, large scale econometric models neglect the supply side of the economy.

The reason the Wharton forecast fully anticipated the recessionary impact of the 1973 oil embargo and subsequent price escalation in energy markets is that supply limitations were imposed on the projections from the Wharton Model in October, 1973. These constraints were fully explained in a paper entitled "Supply Constraints in Demand Oriented Systems: An Interpretation of the Oil Crisis" delivered in Vienna (January, 1974) (printed in Zeitschrift für Nationalökonomie, March, 1974, pp. 45–56).

Another reason why Wharton Econometric Forecasting Associates have emphasized supply side modelling for such a long time is that we recognize the inability of aggregative demand management policies to deal fully with the economic problems of our times. This is not to deny the importance of demand side policies. They are necessary but not sufficient. After they have been put in place in an appropriate way, we must turn attention to policies for the thorny issues of achieving better energy balance between supply and demand, protecting the environment, achieving an equitable distribution of income, increasing productivity, stemming inflation, and stabilizing the dollar. To achieve these multiple goals, we must look far beyond demand management. That is an accepted point of view among many econometricians and finds its place in the opening statement of the final version of the Humphrey-Hawkins Bill.

SUPPLY SIDE CONTENT IN THE WHARTON MODEL

There are two Wharton Models dedicated to explanation of U.S. economic activity. One model is quarterly and focuses on short run business cycle analysis. The other is annual and emphasizes trend analysis, for decades or longer periods, in yearly steps. It is the latter model that has the principal supply side emphasis in the Wharton group, but both the short and long run models have a great deal of supply side content.

The centerpiece of the Wharton Annual Model is an input-output sector with some 56 sectors in a square array, showing inputs up and down columns and outputs across rows. Input-Output systems by themselves contain large amounts of supply side information from the point of view of technology and capacity limitations on the economy but are used in the Wharton Model in a way that contributes particularly to supply side phenomena. The coefficients in the table are not fixed, as in conventional input-output analyses, but are variables. They vary according to shifts in relative prices. This feature have been especially important for interpreting technical changes from the supply side as a result of large shifts in relative prices of energy products. By using the input-output system in this way, the Wharton Model was able to predict a decline in the national ratio of energy use to GNP, a crucial development that has been going on at a significant pace since the Embargo of 1973.

Not only has the Wharton Model made projections of shifting patterns of energy use since 1973, but it has also studied the impact of energy on the economy by relating energy import prices to domestic inflation with slower real growth. What has been true of energy, has also been the case for other basic material markets including agricultural products. Energy, materials, capital, and labor costs all impact on domestic prices in the Model. These impacts are moderated by productivity gains or accentuated by productivity losses. Factor productivities are also important variables in the Wharton Model, generated by technical production function relationships.

The supply of goods, whether as inputs or as outputs, reflects the forces operating on the supply side of the economy. The supply of factors of production also contributes to the supply side analyses. In this respect, the Wharton model goes far in developing equations for labor supply. Population, labor force par-

ticipation, and unemployment are all generated by (1) age and (2) sex groupings. Fundamental demographic processes of birth and death are partly responsible for population and labor force estimates, but real wages, disposable income, and unemployment rates are important economic variables in these relationships. These three variables are used for the labor supply function of the Wharton Quarterly Model. The Annual Model uses only the unemployment rate, in a lag distribution, at the present time.

A great deal of attention attaches these days to the effect of taxation on economic incentive. Indeed, the proper meaning of supply side economics is often distorted by being interpreted solely as a reflection of tax-related incentives. In its proper place, the Wharton Model relates tax rates to labor supply. The equations of labor force participation show that supply of effort responds inversely to indirect taxation because such imports lower the real wage incentive (by raising the denominator). In general, indirect tax increases (other things unchanged) lead to lower real output and employment. This is why OPEC increases of crude oil prices restrain output and spur inflation. This is a perfectly natural model result and has been a feature of our analysis for the past seven years.

Direct taxes also enter the equations of labor supply. As real disposable income per capita rises, labor supply tends to fall. This is a classical economic phenomenon known as the "backward bending supply curve of labor." Disposable income subtracts taxes from gross personal receipts; therefore, as taxes fall, disposable income rises and (with a distributed time lag) labor supply slackens.

Special tax incentives—investment tax credit, accelerated depreciation charges, and employment tax credits—all work in the same direction. As the incentives are increased, production and employment rise. There will be cyclical gains in productivity and consequently tendencies to restrain inflationary pressures. In the case of investment incentives, there will be additional gains in the form of trend increases in productivity. In the medium term this enhances real growth and restrains inflation.

The Wharton Index of Capacity Utilization has been in use for almost 20 years as an indicator of supply side economic restraint. On many occasions, we in the Wharton group have disputed other index measurements that gave misleading impressions about abundance of spare capacity in the economy. The Wharton Index has served well in providing early warnings about inflationary pressures associated with escalation of the military effort in Vietnam, the commodity price explosion of 1973, and the expansion of 1977–79. By its very construction, the Wharton Index is more sensitive to supply limitations than are other indexes because it is indirectly associated with general equilibrium throughout all the sectors of the economy as a whole. In the Wharton Quarterly Model, capacity output is endogenously generated by the production functions of the system; therefore, capacity output and the degree of capacity utilization are integral parts of the system, feeding into productivity and investment. This methodology is fully documented and explained in an article "Direct Estimates of Unemployment Rate and Capacity Utilization in Macroeconometric Models" (published in International Economic Review, October, 1979, pp. 725–740). This indicates that capacity constraint problems have long been recognized as important in the structure of the Wharton Model and have contributed much to inflation analysis. It is simply incorrect to state that the supply side has been neglected.

SOME SUPPLY SIDE SENSITIVITIES OF THE WHARTON MODEL

To illustrate how supply side effects work their way through the Wharton Model, let us consider changes in assumptions about oil prices. In a base line forecast over the period 1981–1989 (prepared in November, 1979) the world oil price was assumed to increase on average by 9.0 percent. In an alternative projection, we increased this price trajectory to the average rate of 12.3 percent.

TABLE I.—EFFECTS OF ALTERNATIVE OIL PRICES

(In percent)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Baseline price	24.9	13.8	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Higher price alternative	24.9	14.7	10.3	11.9	14.3	13.7	12.5	12.0	12.0	12.0
Baseline GNP	0	3.4	3.1	2.8	3.3	2.9	3.0	2.7	2.8	2.7
Alternative GNP	0	3.3	2.9	2.7	3.0	2.4	2.8	2.5	2.5	2.6
Baseline inflation	9.1	8.2	8.1	7.5	7.0	6.5	6.5	6.4	6.3	6.3
Alternative inflation	9.1	8.2	8.3	7.7	7.4	7.0	7.1	7.1	7.0	7.0

On average, the real growth rate drops from 2.9 percent to 2.66 percent and the GNP deflator, as a measure of overall inflation, rises from an average of 7.33 percent versus 6.84 percent in the base case. Thus, the model produces quantitative estimates of the extent to which foreign oil price changes induce higher inflation and lower growth. Towards the end of the decade, the unemployment rate is a full point higher under the high price alternative and the productivity improvement factor runs about 0.1 to 2.0 percentage points lower. The all important energy/GNP ratio falls in both projections, but in the base case it reaches 46.8 (thousand BTU/GNP, 1972$) by 1989, while in the alternative it falls to a point as low as 45.55 (thousand BTU/GNP, 1972$). In terms of millions of BTU consumed per persons the respective figure for 1989 are 359.4 versus 343.1, a saving of 4.5 percent.

A popular policy proposition depending on supply side effects on the economy is the proposal to deal with the productivity slow down through investment expansion. The resulting investment outlays will simultaneouly stimulate the economy (through the demand side) and contribute to lesser inflationary pressures (through the supply side—productivity gains) and work towards coping with stagflation.

Wharton Model inputs were changed to reflect an increase in the investment tax credit from 10 to 20 percent and its extension to structures investment as well as equipment. The end result is an improved real growth rate, a lower inflation rate, and better yearly increments to productivity. The relevant figures are set out in table II, where the investment tax credit alternative is set beside the baseline solution of December, 1979. The investment tax credit policy was chosen for simplicity of application in the present exercise, but similar improvements could have been achieved through accelerated depreciation or other kinds of investment incentives.

According to table II, the increase in the investment tax credit raises the real growth rate by just under one-half percentage point for the first half of the decade, but the growth patterns of the two projections approximately converge after 1985. The improvements to productivity growth and inflation rate are more persistent and prevail for the whole decade.

TABLE II.—EFFECTS OF INVESTMENT TAX CREDIT

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Baseline GNP	−0.3	2.5	2.3	2.5	2.7	3.0	3.0	3.1	3.0	3.2
Tax credit alternative	−.1	3.1	2.7	2.7	3.1	3.1	3.0	3.0	3.1	3.0
Baseline inflation	9.3	7.7	7.7	6.8	6.8	6.5	6.5	6.2	6.0	5.7
Tax credit alternative	9.3	7.5	7.5	6.6	6.5	6.1	6.2	5.9	5.6	5.3
Baseline productivity	−.5	1.9	1.2	1.2	1.3	1.5	1.4	1.5	1.4	1.6
Tax credit alternative	−.4	2.2	1.4	1.4	1.6	1.6	1.5	1.6	1.7	1.6

TAXES AND ECONOMIC INCENTIVES

Targeted reductions in taxes through investment credits, employment credits, or depreciation allowances all work, in the Wharton Model, in the expected direction of increasing capital formation or employment. Also, cuts in indirect taxes hold down price indexes and stimulate final demand. These are well established tax effects and play important roles in the Wharton Models—whether Quarterly (short run) or annual (medium term). But to some economists and to many interested citizens, supply side economics is, as we already noted, closely identified with general cuts in direct taxes.

Tax cuts stimulate the economy through expenditure increases on the demand side. This effect shows up clearly in demand oriented models as a typical fiscal policy exercise. They contribute, in the very short run, to budget deficits (or lower surplus) and to general inflationary pressure. A new element has been injected into the ongoing economics debate through supply side arguments that claim that lower tax rates will spur work incentives, raise productivity, increase public revenues, and, ultimately, restrain inflation.

Work incentives are subjective. While it is not impossible to establish their relationship to taxation, it is a very difficult process that cannot be validated by mere assertion. Some real evidence, beyond personal hunches, will have to be brought to bear on the argument in order to make the case convincing.

The assertion that lower rates of taxation induce more work effort has about the same status of scientific validation as the assertions, during 1978, that lower

capital gains rates induce more funds for venture capital. It was not proven, on the former occasion, that subjective investment decisions respond inversely to capital gains rates. There is some plausibility to the hypothesis, but deep research would have to be undertaken to establish the relationship on a footing that equals our confidence in the relationships between investment and the targeted tax incentives mentioned earlier. There is a fair history of changes in investment tax incentives on which to base an estimate of the effects on capital formation. There is no comparable data base for changes in investment and changes in capital gains rates or for changes in work effort and changes in personal income tax rates.

Personal interviews of workers and examination of work place records would be needed, on a systematic sampling basis, in order to establish the kind of relationship that proponents of tax cutting think exists. If there were an independent increase in productivity as a result of tax reductions, the inflation factor could be reduced or held in restraint, but we do not know that this effect is well based in fact. There is some evidence for the "backward bending supply curve of labor", and this effect works in the opposite direction. It would be misleading to claim that this effect necessarily outweighs the effect that would increase productivity, but there is good evidence that the work-leisure trade-off is a real phenomenon.

SOME TENTATIVE RESPONSES

In calling these hearings, Senator Bentsen asked some searching questions.

Question 1. Do taxes, inflation, and government regulation have effects on the supply of labor, capital, and production which have not been adequately captured in recent years by demand-oriented econometric models?

Answer. Some of the better known econometric models have a great deal of supply side content and are not as heavily demand oriented as many people think. The effects of taxes, inflation, and government regulation are well understood in the investment process. Government regulation effects worker productivity and this is well shown in some models. The principal issue that remains to be settled in whether the rate of direct taxation has an effect one way or the other. The effects of indirect taxation are already included in some models.

Question 2. What areas on the supply side offer the most intriguing prospects for investigation and research?

Answer. Econometric models are approximations to reality and can obviously be improved in the estimation of supply side effects that are already present. Much work needs to be done to improve and extend the treatment of government regulation for protection of the environment, maintaining competition, protection of health and safety. More of these regulations and their associated costs should be explicitly included. Supply limitations of energy and other resources should be given separate display in models. A number of these limitations have already been modeled, but there is room for a great deal of improvement, especially on the side of opening up new supplies. Definitive research projects for investigating effects of capital gains taxation, value added taxation, and the general levels of income taxation should be initiated.

The supply of savings, by type of asset/liability instrument and sector should be introduced into econometric models. This can be done most effectively by fully integrating a flow-of-funds system with a large supply/demand model.

Question 3. What traditional policy tools, approaches, or rules of thumb should be re-assessed, modified or even scrapped in view of new undertanding of supply side factors?

Answer. There should be a recognition that the traditional inflation-unemployment trade off is not an unique relation. An appropriate supply side model, like the Wharton Model, can produce a positive association between inflation and unemployment if price rises occur as a result of supply side shocks. There should also be full recognition of the fact that demand management must be supplemented with supply side policies dealing with structural changes if economic stability is to be achieved in the face of the kinds of problems that confront us at the present time.

Question 4. Can the government use the economics of incentives more skillfully in the future to deal with problems of productivity, inflation, and employment simultaneously instead of on an either-or basis?

Answer. In the first place, government should have multiple targets. It is possible to improve the prospects for productivity, inflation, and employment simultaneously. One of the most promising routes would be to introduce well

balanced investment incentives in the tax system, to establish youth differentials in the minimum wage, to roll back social security payroll tax increases, to streamline government regulation of the economy, to induce more energy conservation, and to enhance energy supplies. These are not comprehensive, but are main policy lines that could lead us far along the path to better stability of the economy.

Senator BENTSEN. Our next witness is Mr. Norman Ture, who is the president of Norman B. Ture, Inc. We are very pleased to have you back before us.

STATEMENT OF NORMAN B. TURE, PRESIDENT, NORMAN B. TURE, INC., WASHINGTON, D.C., AND PRESIDENT, INSTITUTE FOR RESEARCH ON THE ECONOMICS OF TAXATION

Mr. TURE. Thank you. It is nice to be here.

I think the committee deserves an enormous amount of credit, both for perceptions of the kind of policy problems that you are confronting now, and for the nature of this inquiry. I do not know that there is another committee of the Congress, and probably not another governmental agency any place in the world, that would undertake a hearing of this sort, and I think you deserve a great amount of credit.

Senator BENTSEN. Thank you, sir.

Mr. TURE. I think there is an inclination among policymakers, just as there is among economists, to blame the inadequacies of public economic policy on the tools that we use—on the deficiencies of econometric models, and to give too little attention to the conceptual sources of those inadequacies.

More than better models are needed to improve public economic policy today. The basic requirement is to change the fundamental concepts about how tax, government spending, regulatory, and monetary policy affect economic behavior and the performance of the economy.

In my discussion, I am going to attempt first to present what I regard as the basic distinguishing characteristic of supply-side economics.

Second: I want to delineate the attributes of an econometric model which is built in a supply-side conceptual framework.

Third: I want to explore the public policy implications of the supply-side analysis, and contrast that with those of the aggregate-demand approach, particularly in reference to the specific questions, Mr. Chairman, on which you have asked this panel to focus.

First: The distinguishing characteristics of the supply-side analysis:

Supply-side policies are not merely addenda to the longstanding efforts to control aggregate demand by Government actions. By the same token, econometric modeling of supply-side analysis precludes merely adding supply equations to the aggregate demand model.

The phrase "supply-side economics" in fact is a misnomer. It suggests incorrectly that this analytical approach is distinguished from the more conventional analysis, because it focuses on the effects of Government actions on supply rather than on demand conditions.

The actual distinction is that the supply-side analysis identifies the initial effects of a tax or another fiscal action in terms of what it does to one or another relative price, and seeks to describe and measure the responses of households and businesses to such relative price changes.

These responses are very likely to entail changes in the total amount of one or another production input, and therefore they will result in changes in output and income. These changes in income, in turn, will lead to further changes in economic activity.

But, let me emphasize, this income effect is secondary in sequence, even though it may be very large indeed.

In contrast, the aggregate-demand approach identifies tax and other fiscal changes principally in terms of their effects on aggregate disposable income, the changes in which are deemed to lead to changes in spending in the private sector.

The distinctive attributes of the supply-side analysis is best illustrated in the case tax policy. Every tax has the attribute of altering a relative price or cost. This is obvious in the case of a selective excise—say an excise on gasoline. Everybody sees that as raising the price the motorist must pay for gasoline compared to the prices he pays for other things.

This price or cost effect is not limited to those taxes we call excises Every tax has some excise effect. If we could devise a perfectly neutral tax, it would be one which had no excise effect at all. It would increase in the same proportion every single price and cost paid by people and entities in the private sector.

Our present tax system very thoroughly violates this neutrality criterion. For example, the individual income and payroll taxes greatly increase the cost of working, as opposed to nonmarket uses of one's time and resources.

The income taxes on both individuals and corporations, by taxing both the income which is saved and the returns on that savings, very substantially increase the cost of saving compared with consumption.

While every tax affects some one or more relative price, no tax has any initial effect on income. Let me try to show this by tracking out the treatment of a tax cut in the aggregate-demand approach and show why it cannot be correct.

Let us start from a position of a balanced budget. Assume a reduction in income taxes, say, with no reduction in Government spending. According to the aggregate-demand approach, this will result immediately in an increase in disposable income the largest part of which will go to increase consumption demand. And presumably this will result in an increase in business demands for production inputs, labor, and capital; and that will result in additional employment of labor and capital services, and therefore increases in output.

What invalidates this scenario is that since the tax cut, by assumption, is not matched by a Government spending cut, the loss in tax revenues results in an equal increase in the deficit. But then the additional disposable income resulting from the tax cut must be used to buy the additional Government debt. If some people use their additional disposable income to finance additional spending for goods and services, then some others will have to reduce their spending in order to buy the additional debt instruments. We can get some redistribution of spending as a result of something of this sort, but no increase in the aggregate amount.

More fundamentally, a tax cut does not, in and of itself, increase the economy's aggregate income because it does not, in and of itself, increase the amount of productivity of production inputs. Unless you

believe in magic, the tax cut does not itself result directly in any increase in output or income.

If an increase in income is to be forthcoming, it can only result from the tax cut's inducing an increase in the supply of labor and capital services. And to have this result, the tax cut must reduce the relative cost of market-directed effort and of saving.

The supply-side analysis seeks to explain the effects of fiscal actions by delineating the ways in which households and businesses respond to these changes in relative prices and costs—implicit or explicit—which are the first-level effects of fiscal action.

This analysis does not exclude income as a major determinant of economic behavior. On the contary, income effects are deemed to be extraordinarily powerful. But analysis must begin with identification of the effects of alternative fiscal actions on relative costs and prices, and with delineation of how private-sector entities respond thereto at the initial income level.

It is the way in which people respond to these relative price effects which determine the changes in composition and level of total economic activity. And these changes in income which result therefrom will enter into decisions about working, saving, investing, and lead to further changes in output and income.

Let me turn now to the attributes of a supply-side model that tries to incorporate this conceptual context. Just as the supply-side economics differs from the aggregate-demand approach in fundamental conceptual terms, a supply-side econometric model differs fundamentally from an aggregate-demand model.

An aggregate-demand model cannot capture the supply-side economics merely by the addition of equations representing conditions of supply. So long as the model retains first-level income effects of fiscal changes as determinants of the amount and composition of spending, it is at odds with the basic conceptual content of supply-side economics.

A supply-side model might be constructed to serve any number of purposes. As a device for analyzing the effects of fiscal actions on the economy and on government tax revenues, its focus will be primarily but not exclusively on the long-term trends of major economic magnitudes, and the changes therein consequent to fiscal action.

This long-term focus reflects the uses to which the model is to be put, not an inherent incapacity of this conceptual approach to analyze shortrun adjustments to economic disturbances.

As a device for analyzing and measuring how the economy responds to fiscal changes, the model must be actuated by the relative price attributes of the fiscal system and the relative price effects of fiscal changes.

It precludes specifications of any of the behavioral functions in the model in such a fashion as to pick up any first-level income effects of a fiscal change. No tax or government expenditure action may be allowed to enter any of the aggregate behavioral functions as a change in disposable income. The inclusion of any such specification invalidates the model as a supply-side formulation.

By virture of this constraint, the supply-side model entails no multiplier manipulation—the familiar device of the aggregate-demand model. In fact, the supply-side analysis rejects out of hand

any demand-impelled multiplicative effect on total income or output from any fiscal action.

As a corollary to this basic set of requirements, fiscal variables must be specified in the various equations of the model in "marginal" not "average" terms.

In the interests of time, Mr. Chairman, let me turn now to some of the policy questions which you addressed to us.

Your first question was: Do taxes, inflation, and government regulation have effects on the supply of labor, capital, and production which have not been adequately captured in recent years by demand-oriented econometric models?

Well, the record speaks for itself and answers your question affirmatively: Indeed they do. The demand-oriented models embody a set of concepts giving primary, and indeed virtually exclusive emphasis, to aggregate demand, as the principal determinant of the amount of production and employment.

The dependence of these models on first-level income effects accounts for their failure to analyze, describe, and measure adequately the effects of taxes, inflation, and so forth, on supplies, output, and income.

They fail to show, for example, the effect of inflation in raising the real cost of providing labor and capital services, hence, the constriction of output growth, which is one of the major effects of inflation.

Similarly, by focusing principally on the disposable income effects of tax changes, demand-oriented models cannot pick up the effects of tax policy on factor-supply conditions, and therefore total output and income.

You second question was: What areas on the supply side offer the most intriguing prospects for investigation and research?

I think that question has been answered by the other panel members and by Ms. Rivlin. Indeed, I think the most intriguing question, the most urgent question for our research, is to determine a great deal more than I thing we now know about the responsiveness of labor and capital supply conditions to changes in costs resulting from taxes and fiscal changes.

Let me note, however, as a qualification on that: Changes in the marginal rate of tax on labor income should be perceived as involving "only" relative price effects at the outset. Such tax changes do not have any first-level income effects. So the possibility of a negative income effect on labor supplies from a marginal tax rate cut simply does not exist as a first-level effect. It would be only as a result of an increase in labor supply and total ouput that some negative shifting of the labor supply function could occur.

You asked, Mr. Chairman, what traditional policy tools, approaches, or rules-of-thumb should be reassessed, modified, or even scrapped, in view of the new understanding of supply-side economics.

One of the fundamental implications of supply-side analysis is there is no payoff in focusing fiscal policy on the control of aggregate demand. The corollary conclusion is that there is no valid purpose to be served by attempting to get government spending targets by reference to the supposed contributions of these outlays to aggregate demand. And a policy focused on the total amount of tax revenues

is similarly inappropriate as a means of influencing the level or change in total economic activity.

In the same connection, the size of the deficit should not be perceived as a relevant variable for policy manuipulation in the interests of attaining designated levels or rates of growth in employment, ouput, and income.

Finally, your question was: Can the government use the economics of incentives more skillfully in the future to deal with problems of productivity, inflation, and employment simultaneously, instead of on an "either/or" basis?

Supply-side economics rejects outright any so-called "Phillips-curve" relationship between inflation and unemployment. By the same token, it rejects the view that price-level stability can be purchased only at the cost of unacceptably high levels of unemployment, or that acceptable growth in employment depends on pursuit of fiscal and monetary policies which are likely to spur inflation.

On the contrary, the supply-side analysis shows that public policy actions which are correctly designed to remove the impediments to employment and to saving and capital formation will curb, not enhance, inflationary pressure.

The root cause of inflation—the increase in the overall level of prices—always has been too fast a growth in the stock of money relative to the growth in real output. With any given rate of increase in the stock of money, the more effective tax measures are in increasing the supply of labor and in reducing the existing tax bias against saving and capital formation, the less will be the upward pressure on the price levels.

The corollary is that a monetary policy which succeeds in curbing inflation will enhance expansion of supplies of labor and capital services and total output and income. Inflation augments the existing tax bias against effort and against saving by increasing the real marginal rates of income tax, thereby reducing the real after-tax returns for the use of labor and capital services, hence constricting the expansion of labor and capital input and total output.

Pursuit of a tight monetary policy—that is, one which holds firmly to a steady, very moderate rate of increase in the stock of money, accordingly is not at odds with the Employment Act goals of high rates of growth in employment and output.

On the contrary, an anti-inflationary monetary policy enhances the prospects for a successful pursuit of those objectives.

Thank you.

Senator BENTSEN. Thank you, Mr. Ture.

[The prepared statement of Mr. Ture follows:]

PREPARED STATEMENT OF NORMAN B. TURE

SUMMARY

My discussion today focuses on the distinguishing characteristics of "supply-side" economics, the basic attributes of a model which embodies the "supply-side" hypotheses, and some of the implications for public policy goals and procedures of the application of the "supply-side" analysis.

I. Distinguishing characteristics of the "supply-side" analysis

"Supply-side" economics entails a fundamentally different analysis of the way in which government actions affect the economy from the demand-oriented

approach. It is not merely the addition of supply equations to aggregate demand formulations; it is not a companion piece to the demand-oriented approach.

The distinctive characteristic of the "supply-side" analysis is that it identifies the initial effects of tax or other fiscal actions in terms of the changes in relative prices these actions entail and seeks to describe and measure how households and businesses respond to these relative price changes. There responses are likely to take the form of changes in the total amount supplied of one or another production input, hence changes in total output and income. These second-level income effects are also likely to be powerful influences on the level and composition of economic activity. The "supply-side" analysis doesn't exclude income as a determinant of economic behavior, but it does hold that the initial effects of fiscal actions cannot be identified as changes in income. In summary terms, the "supply-side" analysis (1) ascribes to fiscal actions a first-level effect on (explicit or implicit) relative prices, (2) rejects the view that fiscal actions can have a first-level effect on total income, and (3) holds that changes in income result from the responses by households and businesses to the relative price changes generated by fiscal actions.

In contrast, the aggregate demand approach identifies (incorrectly) the first-level effects of fiscal actions as changes in (disposable) income (most of which goes to increase spending. No such effect can result for the economy as a whole. To see this, consider an income tax cut, starting from a balanced budget. At the outset, the initial increase in disposable income must be exactly matched by the deficit resulting from the loss in income tax revenues. Hence, the additional disposable income must, in the aggregate, be allocated to purchase of the additional government debt issues. If some people use their additional disposable incomes for additional spending, others will have to reduce their spending. No change in aggregate outlays can result at the outset from the increase in disposable income.

More fundamentally, a tax cut does not itself directly increase the amount or productivity of production inputs without which no increase in output or income can be obtained. If an increase in income is forthcoming it is only because the tax reduction, by lowering the cost of work and saving, induces people to supply more labor and capital services.

II. Attributes of a "supply-side" model

An econometric model which embodies the "supply-side" analysis differs in fundamental respects from an aggregate demand model. A demand-oriented model cannot capture the "supply-side" economics merely by the addition of supply equations. So long as a model retains first-level income effects of fiscal changes as determinants of the amount and composition of spending, it is at odds with the basic conceptual content of "supply-side" economics.

As a device for analyzing and measuring the aggregate economic response to fiscal changes, the supply side model must be actuated by the relative price attributes of the fiscal system and by the relative price effects of fiscal changes. This requires inclusion of pertinent price terms in the specification of household and business behavior. Consumption (or saving), for example, must be represented as determined not only by permanent income or wealth but as well by its cost relative to that of its alternative—saving (or consumption), where the cost includes the effects of taxes or government outlays. As a corollary, desired stocks of capital must be represented as responsive not only to levels of aggregate income or wealth, but also to the net-of-tax cost of the future income produced by capital relative to the cost of current consumption. The specification of the supply of labor services must include as a major determinant the real wage rate, net of tax and of government transfer payments which represent payments for not working. None of the equations can specify fiscal actions as having first-level income effects. The inclusions of any such first-level income effect invalidates the model as a "supply-side" formulation.

Conceptually as well as mechanically, the "supply-side" analysis rejects any demand-impelled multiplicative effect of fiscal changes on total income. Exclusion of first-level income effects accordingly, eliminates any "multiplier" manipulation.

Fiscal variables in a "supply-side" model's specifications of behavioral functions must be in their marginal rather than average or effective rate dimension. This is in keeping with the principle that taxes enter into household and business decisions at the margin. The aggregate demand analysis, on the other hand, by virtue of its reliance on first-level income effects, focuses on effective rates, since these measure the effect of fiscal actions on disposable income.

In the "supply-side" analysis there is no conceptual distinction between the act of saving and investment. The "supply-side" model, accordingly, does not specify separate behavioral functions for saving and investment. The policy implication is that there is no occasion for distinguishing tax proposals intended to encourage saving from those aimed at promoting investment. A "10–5–3" tax proposal is as much a pro-individual saving measure as it is a pro-business capital formation device.

III. Embodying "supply-side" economics in public policy

The specific questions addressed by the Chairman of this panel provide a useful framework for discussing the policy implications of "supply-side" economics.

1. Do taxes, inflation, and government regulation have effects on the supply of labor, capital, and production which have not been adequately captured in recent years by demand-oriented econometric models?

The dependence of demand-oriented econometric models on first-level income effects accounts for their failure to analyze, describe, and measure adequately the effects of taxes, inflation, etc., on factor supplies, output, and income. These models, for example, fail to show the effect of inflation in raising the real cost of providing labor and capital services, hence the construction on output growth which is a major effect of inflation. Similarly, by focusing principally on the disposable income effects of the tax changes, demand-oriented models cannot pick up the effects of tax policy on factor supply conditions and, therefore, total output and income.

2. What areas on the supply side offer the most intriguing prospects for investigation and research?

Since the "supply-side" analysis and models embodying it depend on the relative price effects of fiscal actions, the most urgent research concerns are improving knowledge of the nature and magnitude of response in the private sector to these effects. In particular, research should focus on the relative strength of income and price effects on the supply of labor services. It should be noted, however, that changes in the marginal rates of tax on labor income involve only relative price effects at the outset, since, as stressed earlier, tax changes do not have first-level income effects. Similarly, the elasticity of saving response to the price effects of tax changes requires additional investigation.

3. What traditional policy tools, approaches, or rules of thumb should be reassessed, modified, or even scrapped in view of new understanding of supply-side factors?

One of the major casualties of adopting "supply-side" policies is the effort to control aggregate demand by fiscal policy. Neither government spending totals nor total tax revenues should be targeted by reference to their supposed contribution to aggregate demand. As a corollary, the multiplier analysis should be scrapped.

The "supply-side" analysis, in sharp contrast with the demand-oriented approach, urges that appropriately designed tax reductions, by spurring increases in supplies of capital and labor services, will reduce, not increase, inflationary pressures. Tax cuts to curb inflation must have the effect of reducing marginal income tax rates.

4. Can the government use the economics of incentives more skillfully in the future to deal with problems of productivity, inflation, and employment simultaneously instead of on an either-or basis?

The "supply-side" analysis shows that policies aimed at enhancing productivity, expanding output, and curbing inflation are not at odds with each other but are, rather, mutually reinforcing. Fiscal actions which remove impediments to employment, saving and capital formation, by reducing their relative costs, will constrain, not augment, inflationary pressures. A tight monetary policy which curbs inflation will enhance expansion of supplies of capital and labor services, hence lead to higher levels of output and income than otherwise.

The "supply-side" analysis also shows that tax policies to promote private saving and capital formation principally benefit suppliers of labor services by augmenting the advance of labor's productivity, hence increasing the demand for labor services, employment, and real wage rates.

"SUPPLY-SIDE" ECONOMICS AND PUBLIC POLICY

I am very pleased to have the opportunity to present to the Joint Economic Committee some observations on so-called "supply-side" economics and its applications for public economic policy purposes. The Committee deserves great

credit for the highly innovative approach it has taken to the long-standing problems of determining how public policies affect the performance of the total economy. More particularly, the Committee is to be highly commended for having recognized the severe limitations on effective public policy, given the objectives of the Employment Act of 1946, resulting from relying on the aggregate demand-oriented analysis.

There is an inclination among public policy makers, as well as among economists, to blame the inadequacies of public economic policy on the deficiencies of econometric models and to give too little attention to the conceptual sources of these deficiencies. To be sure, there is abundant occasion for dissatisfaction with the standard econometric models; public policy will be well served by junking them outright. But more than better models are needed to improve public economic policy. The basic requirement is a change in the fundamental concepts about how tax, government spending, monetary, and regulatory policies affect the economic behavior of households and businesses. Models which implement and embody this different conceptual framework will be far more useful tools for policy makers in quantitatively assessing the likely effects of policy changes. But since econometric models can't be better than the concepts they embody, the conceptual revisions are the top priority.

The Joint Economic Committee has given major impetus for the innovative work which is now being done in the universities and in research organizations in the field of "supply-side" economics. One must hope that the Committee will inspire the same sort of innovations in the work of the professional staff community of the Congress.

In the discussion which follows, I shall attempt first to present the basic distinguishing characteristics of "supply-side" economics, second to delineate the attributes of an econometric model which is built in the "supply-side" conceptual framework, and third to explore the public policy implications of the "supply-side" analysis in contrast with those of the aggregate demand approach, by reference to the specific questions, Mr. Chairman, on which you have asked this panel to focus:

(1) Do taxes, inflation, and government regulation have effects on the supply of labor, capital, and production which have not been adequately captured in recent years by demand-oriented econometric models?

(2) What areas on the supply side offer the most intriguing prospects for investigation and research?

(3) What traditional policy tools, approaches, or rules of thumb should be reassessed, modified, or even scrapped in view of new understanding of supply-side factors?

(4) Can the government use the economics of incentives more skillfully in the future to deal with problems of productivity, inflation, and employment simultaneously instead of on an either-or basis?

I. The distinguishing characteristics of the "supply-side" analysis

Distinguishing the "supply side" analysis from the aggregate demand approach is essential for understanding why some public policy strategies are consistent with policy objectives while others are either unsuccessful or counterproductive. With these conceptual differences in mind, it is clear that "supply-side" policies are not merely addenda to the long-standing efforts to control aggregate demand by government actions. By the same token, econometric modeling of the supply-side analysis precludes merely adding supply equations to the neo-Keynesian aggregate demand models. More fundamentally, the supply-side analysis urges that public policy should not focus at all on control of aggregate demand. The implications of rejecting that policy focus for the work of the Congressional Budget Committees and of the Congressional Budget Office will be suggested at a later point in this discussion.

To begin with, it should be noted that the phrase "supply-side economics" really is a misnomer. It suggests, incorrectly, that this analytical approach is distinguished from the more conventional analysis by its focus on the effects of fiscal actions on supply rather than on demand conditions. In fact, however, the actual distinction is that the "supply-side" analysis identifies the initial effects of a tax or other fiscal action in terms of what it does to one or another relative price and seeks to describe and measure the responses of households and businesses to such relative price changes. These responses are very likely to entail changes in the total amount of one or another production input, hence changes in total output and income. These changes in income will, in turn, lead to further changes in economic activity, but this income effect is secondary in

sequence, even though it may be very large indeed. In contrast, the aggregate demand approach identifies tax and other fiscal changes principally in terms of effects on aggregate disposable income the changes in which lead to changes in the spending of the private sector. While relative prices are not ignored in this approach, they are given a secondary role.

In summary terms, the "supply-side" analysis—ascribes a first-level relative price effect to fiscal actions; rejects the view that fiscal actions can have a first-level effect on total income; and posits that changes in income result from household and business responses to changes in relative prices generated by fiscal actions, while the aggregate demand approach identifies first-level income effects of fiscal actions which are deemed to be the principal way in which these actions affect economic activity.

Since its distinctive attribute is its focus on the relative price effects of fiscal actions, one might well ask why the label "supply-side" has been given to this analysis. One reason is that its application to the appraisal of fiscal actions leads quickly to the effects of these actions on the relative costs of working in market-oriented jobs vs. "leisure" and of saving and investing vs. consuming. Changes in these relative costs affect the supply of labor and capital services which in turn affect the volume of production. The other reason, far more widely publicized, is that these supply responses are deemed by some to be sufficiently large to offset—or more than to offset—the effects of fiscal actions on the net budget position of the government. Indeed, "supply-side economics", so depicted, has elicited derision from economists, on both the right and left of the political economic spectrum, as a kind of fiscal alchemy which transforms deficits into surpluses or which provides a fiscal "free lunch." There is, however, nothing in the basic "supply-side" analysis which holds that tax cuts, say, will so expand output, hence tax bases, as to provide more revenue than would otherwise be generated. The broadest generalization that can be derived from this analysis is that the net effect on government revenues, when account is taken of the changes in economic activity the tax cut generates, will differ from that which is estimated when these economic effects are ignored. But this generalization is not unique to the "supply-side" analysis, hence is not its distinguishing feature.

To repeat, the distinctive attribute of this analysis is that it identifies fiscal actions in terms of initial effects on relative prices. This is best illustrated in the case of tax policy. Every tax has this attribute of altering relative prices or costs. This is obvious in the case of selective excises: an excise on gasoline is seen by virtually everyone as raising the price the motorist must pay for gasoline compared with the prices he or she must pay for other things. This price or cost effect, however, is not limited to those taxes we call excises. Every tax has some "excise effect." A perfectly neutral tax, if one could be devised, would have no excise effect; it would increase in the same proportion all of the prices confronting any entity in the private sector. It would increase the cost of effort in the same proportion as the cost of leisure, of saving in the same proportion as the cost of consumption, of any one consumption good or service in the same proportion as all others, of using labor services in the same proportion as capital services, of any one kind of labor or capital service in the same proportion as any other, etc.

The present tax system very thoroughly violates this neutrality criterion. For example, the individual income and payroll taxes greatly increase the cost of working as opposed to non-market uses of one's time and resources. The income taxes on both individuals and corporations, along with estate and gift taxes, at both the Federal and other levels of government, entail multiple levels of tax on saving compared with consumption uses of income.

While every tax affects some one or more relative price, no tax has any initial effect on income. This, one must concede, is the most difficult conceptual hurdle the supply-side analysis must overcome, since it is intuitively appealing to each of us that a decrease in one's income tax liability, other things equal, leaves one with more income to use as one wishes. But upon reflection it must be evident that this can't be true for the economy as a whole.

To see this, let us track out (admittedly, in oversimplified terms) the treatment of a tax cut in the aggregate-demand approach and show why it cannot be correct.

Starting from a position of budget balance, assume a reduction in income taxes, say, with no reduction in government spending. This, according to the aggregate demand approach, results immediately in an increase in disposable income, the largest part of which will go to increase consumption demand. This

creates an increase in business demands for production inputs—both labor and capital—which results in additional employment of labor and capital services and as a result, an increase in total output.

What invalidates this scenario is that since the tax cut, by assumption, is not matched by a government spending cut, the loss in revenues must result in an equal deficit. But then the additional disposable income resulting from the tax cut must be used to buy the additional government debt. If some people use their additional disposable income to finance additional spending for goods and services, then others will have to reduce their spending in order to buy the additional debt instruments. Some redistribution of spending will occur in this case, but there is no increase in the total amount.

A variant of this view, advanced by the so-called "rational expectations" school, is that people generally will perceive the deficit resulting from the tax cut as the present value of the additional future tax liabilities which will be needed to service the additional debt. Accordingly, they will perceive no increase in their permanent income or wealth, hence will have no impetus to increase their spending.

In broader terms, the tax reduction unmatched by a government spending cut results initially in a decrease in gross national saving. Since gross national saving necessarily is equal to gross investment, the tax cut could at most exchange additional consumption spending for reduced investment. Again, a change in the composition of outlays, but no change in the total, would result.

More fundamentally, a tax cut can not, in and of itself, increase the economy's aggregate income because it does not, in and of itself increase the amount or productivity of production inputs. Unless one believes in magic, therefore, the tax cut doesn't itself result directly in any increase in output or income. If an increase in income is to be forthcoming, it can only result from the tax cuts inducing an increase in the supply of labor and capital services. And to have this result, the tax cut must reduce the relative cost of market-directed effort and of saving.

The supply-side analysis seeks to explain the effects of fiscal actions by delineating the ways in which households and businesses respond to the changes in relative prices and costs, implicit or explicit, which are the first-level effects of fiscal actions. Without going into detailed specifications of these behavioral responses, the analysis holds that at any given income level, people will save more of that income if the cost of saving—the amount of current consumption which must be foregone to obtain the sources of any given amount of future income—decreases. This analysis also holds that at any given cost of saving, the amount that will be saved will be greater the greater the total amount of real income. In the same context, this analysis posits that the quantity of labor services that will be offered at any given level of income will be greater the higher the real wage rate—i.e., the higher the cost of not working—but that at any given real wage rate, the amount of labor services supplied will be less the greater the total real income.

Clearly, the "supply-side" analysis does not exclude income as a determinant of economic behaviour. On the contrary, income effects are deemed to be extremely powerful. Indeed, a major focus of this analytical system is on the effects of fiscal actions on the growth of real income. This is to say, "supply-side" economics posits as the central issue of fiscal policy how income growth trends will differ with differences in the structure of the tax system and in the levels of real marginal tax rates, on the one hand, and in the level and composition of government spending, on the other. To address this issue effectively, analysis must begin with identification of the effects of alternative fiscal actions on relative costs and prices and with delineation of private sector responses thereto at the initial income level. It is the way in which people respond to these relative price effects which determines the changes in composition and level of total income. These changes in income, in turn, will enter into decisions about working, saving, ad investing, as indicated, leading to further changes in output and income.

It should also be clear that the "supply-side" analysis does not ignore the effects of fiscal actions on the composition or level of demand. There is nothing in this analytical framework that rules out a close functional relationship between the level of permanent income or wealth and the amount of consumption people want to undertake, the stocks of capital they wish to hold, and, therefore, the amount of investment they wish to engage in or have undertaken by business enterprises on their behalf. Indeed, an analysis which shows, for example, the effect of a tax change on the relative cost of saving and the response thereto is

just as much concerned with changes in the composition of demand as it is with changes in supply. And as this analysis tracks the subsequent changes in income, saving and investment, it must, by that very token, also track the changes in the level as well as composition of aggregate demand. To repeat an earlier observation, it is not an exclusive or even predominant interest in the effects of fiscal actions on conditions of supply which distinguishes the "supply-side" analysis from the aggregate demand approach. It is instead, the identification of first level price rather than income effects of fiscal actions which is the hallmark of the "supply-side" economics.

II. Attributes of a "supply-side" model [1]

The preceding discussion should make clear that the "supply-side" economics differs from the aggregate demand approach in fundamental conceptual terms. By the same token, an econometric model which embodies the "supply-side" analysis is fundamentally different from an aggregate demand model. An aggregate demand model cannot capture the "supply-side" economics merely by the addition of equations representing conditions of supply. So long as a model retains first-level income effects of fiscal changes as determinants of the amount and composition of spending it will be at odds with the basic conceptual content of "supply-side" economics.

The "supply-side" model is a price-theoretic, general equilibrium model, based on neoclassical theory about the economic behavior of households and business firms. Such a model might be constructed to serve a wide variety of purposes. As a device for analyzing the effects of fiscal actions on major economic magnitudes and government tax revenues, its focus will be primarily—not exclusively—on the long-term trends of these magnitudes and the changes therein consequent to fiscal changes. There is, happily, an increasing consensus in the policy forum that public economic policy should be primarily concerned with the basic trends in the economy and with the basic forces determining and influencing them, rather than with short-term perturbations. Moreover, there is more and more agreement that the focus of public policy in the past on controlling the short-term performance of the economy has been unrewarding and, indeed, has been costly in terms of its longer-run adverse consequences. This Committee has performed a valuable service in pointing-out that the present sorry state of the economy reflects in major part an undue concern in the past with controlling short-run economic outcomes while ignoring the long-run consequences of doing so.[2] This long-term focus of the "supply-side" model aimed at fiscal analysis reflects the uses to which it is to be put, not an inherent incapacity of this conceptual approach to analyze the short-run adjustments to economic disturbances.

As a device for analyzing and measuring how the economy responds to fiscal changes, the supply-side model must be actuated by the relative price attributes of the fiscal system and by the relative price effects of fiscal changes. This requires its specifications of household and business behavior to include as explanatory variables the various price relatives which may be affected by fiscal actions. For example, consumption must be represented as determined not merely by permanent income and wealth but as well by its cost relative to that of future income, where these costs include the effects of taxes and/or government expenditures. Similarly, the stock of capital—the sources of future income—which people want to hold must be represented as responsive not only to present and/or expected levels of income or wealth, but also to the net-of-tax cost of that future income relative to the cost of current consumption.[3] Hence, the supply of capital services must be represented as determined by the amount of the sources of such services people want at differing net-of-tax unit returns. Similarly, the specification of the supply of labor services should include as a major explanatory variable the real wage rate, net of tax, relative to the real return to leisure uses of

[1] A brief nontechnical description of the Analysis of Tax Impacts Model (ATIM), a model built in the image of "supply-side" economics, is provided in the appendix to this discussion.

[2] Joint Economic Committee, Congress of the United States, *Joint Economic Report 1980*, Senate Report No. 96–618, Mar. 4, 1980, pp. 1, 16.

[3] The basic determinants of the real cost of future income are the technical conditions of production as influenced by technological advances and the supply of labor services, which determine the marginal productivity of capital, hence the amount of future income which can be obtained by foregoing some stipulated amount of current consumption and allocating it to the holding or acquisition of capital instruments. These basic determinants, of course, must be appropriately specified in the supply-side model.

time and resources, inclusive of government transfer payments to those not working (e.g., unemployment insurance benefits, etc.).

The basic concepts of the "supply-side" analysis preclude specification of any of the behavioral functions of a "supply-side" model in such a fashion as to pick up any first-level income effects of a fiscal change. No tax or government expenditure action may be allowed to enter any of the aggregate behavioral functions as a change in disposable income. The inclusion of any such specification invalidates the model as a "supply-side" formulation, irrespective of the inclusion of explicit supply equations.

By virtue of this constraint, the "supply-side" model does not lend itself to the "multiplier" manipulation which is a familiar device of the aggregate demand models. Indeed, the "supply-side" analysis rejects any demand-impelled multiplicative effect on total income or output. As stressed earlier, aggregate output and income depend on the amount of production services supplied and the technical conditions of production, and changes in the amount of production inputs respond to the initial relative price effects of fiscal actions, not to any first-level income effects thereof.

As a corollary to this basic set of requirements of the "supply-side" model, fiscal variables must be specified in the various equations in marginal, not in average, terms. In the case of tax variables, for example, this analysis incorporates the well-known, generally accepted but widely neglected principle that taxes enter into household and business decision-making at the margin—it is the amount of tax associated with the incremental dollar of income or expense which affects the price or cost of alternatives and which is, therefore, the relevant decisionmaking variable. It is quite possible, of course, to change tax provisions and thereby to change marginal tax rates without changing, initially, total tax liabilities, hence average tax rates. To anticipate later discussion, the major policy implication of this proposition is that it is not the change in aggregate tax revenues, per se (or relative to government spending) which is operational in changing aggregate output and income, but changes in marginal tax rates, irrespective of whether there is any net budgetary change. The aggregate demand analysis, on the other hand, by virtue of its emphasis on first-level income effects, stresses the change in average tax rates—the change in the aggregate amount of taxes with respect to the given aggregate amount of income—and largely neglects marginal tax rates.

In the "supply-side" specifications, no distinction is or may be drawn between investment and saving activity. This is in sharp contrast with the treatment in the aggregate demand models which include an investment function as an aggregate demand component and as, essentially, the exclusive province of business firms, and a separate, unrelated, individual saving function (more precisely, inidvidual saving falls out as a residual from the consumption function). In the "supply-side" analysis, investment is delineated as the effort to implement changes in the desired stocks of capital; since the function representing the desired stock of capital does not pertain to the business entity but to the population as a whole, investment behavior is not a separate activity from saving. It has the same determinants and is identically influenced by fiscal actions. Accordingly, the "supply-side" analysis has no requirement for separate specification of business firms in an aggregate model. The business firm is implicitly an organization for mobilizing production inputs in ways which maximize the net worth of the owners of businesses, subject to the supply conditions of the production inputs. The demands for these production inputs are represented by their respective marginal value product schedules at any given level of aggregate income, derived from the technical condition of production.

In short, in a "supply-side" model, there is no analytical purpose served by separately specifying business investment functions and saving functions. The decisions to save and to invest are not separate. Businesses do not vie with households for the allocation of income between consumption and capital formation. Businesses act as the agents of their individual owners: as such, their decisions to distribute savings or to retain and invest them or to seek to attract saving in the capital market is made in conformity with the owners' preferences.

It follows from this identity of saving and investment determinants that there is no distinction of substance between tax measures aimed at promoting saving and those intended to encourage investment. For example, the so-called 10–5–3 capital cost recovery proposal is just as much a pro-individual saving measure as it is a pro-business investment tax change. There is no relevant issue of tax policy

to be drawn between reducing excessive tax burdens on individual saving and lightening the tax load on the returns to business capital.

This is not to say that all tax changes aimed at promoting saving and investment are equally effective. Choices are still to be made on the basis of relevant criteria. But whether the measure will help savers (individuals) vs. investors (business) is not a relevant criterion and should be eliminated from policy consideration.

III. Embodying "supply-side" economics in public policy

The specific questions which the Chairman has addressed to this panel concern matters both of anaylsis and policy. The preceding discussion has addressed in broad terms some of the basic analytical issues on which the "supply-side" analysis and the aggregate demand approach differ. At this point I want to address the Chairman's questions primarily in the policy context.

(1) Do taxes, inflation, and government regulation have effects on the supply of labor, capital, and production which have not been adequately captured in recent years by demand-oriented econometric models?

The demand-oriented econometric models embody a set of concepts giving primary—indeed, virtually exclusive—emphasis to aggregate demand as the principal determinant of the amount of production, hence the amount of labor and capital services employed, hence changes in the amount of capital through time. In turn, the level of aggregate demand and changes therein are related in these models primarily to the levels of total government spending and total tax revenues and changes therein. This emphasis leads to ignoring or at least, to minimizing the relative price effects of fiscal and regulatory policy actions.[4] By the same token, it suppresses the effects of fiscal and regulatory policy on the conditions of supply of labor and capital services in the aggregate.

The public policy concern with social security financing well reflects the basic difference in analytical approach embodied in demand-oriented and "supply-side" models. In the former, the scheduled increases in payroll tax rates are treated primarily as reducing disposable income, leading to lower levels of consumption than would otherwise prevail, hence to a contraction of aggregate demand which is some multiple of the increase in payroll tax. One policy prescription offered by those relying on these models and concerned with the adverse effects of the payroll tax increases is to reduce income tax liabilities with the view to maintaining disposable income.

Nothing in these models directs the analytical focus to the effcts of the payroll tax increase on the aggregate amount of labor services that will be offered at alternative nominal after-tax wage rates. For this purpose, the payroll tax and increases therein must be specified in terms of their contribution to the marginal rate of tax on labor income, hence the reduction in the wage rate, which is the principal determinant of the relative costs of effort and leisure. With this specification, the scheduled increases in payroll tax rates are perceived as having a negative effect on the supply of labor services, leading to an increase in pretax nominal wage rates and lower levels of employment than would otherwise prevail.

The policy prescription which emerges from the "supply-side" model is that to be effective in offsetting payroll tax increases, individual marginal rates of tax must be reduced sufficiently to leave the overall marginal rate of tax on labor income unchanged. It does not follow that this policy focus on the marginal tax rate will leave aggregate tax liability initially unchanged. But this is not the relevant consideration if the concern of policy is—as it should be—with the effects of the payroll tax hike on the supply of labor services.

A similar case is provided by the treatment of unemployment insurance benefits in demand-oriented econometric models. These models focus on these benefits as government outlays enlarging disposable income compared to the amounts which would otherwise obtain. At the same time, they ignore entirely the fact that these payments reduce the cost of being "idle" compared with the cost of being employed, hence have an adverse effect on the supply of labor services—artificially elevating the nominal pretax wage rate at which any given amount of labor services is offered. The consequence is, as one might expect, less employment.

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[4] Most of the aggregate-demand econometric models include one or more variables pertaining to the implicit rental price of capital as an argument in their investment functions. Inclusion of this price term should be seen as an uneasy accommodation of price theory. It is often redundant. In any event, it does not act to shift the analytical focus of the determination of capital formation from aggregate demand to alteration of the conditions of supply.

These deficiencies in the demand-oriented models cannot be overcome merely by the addition of equations specifying the supplies of labor and capital services. To repeat an earlier assertion, the basic deficiency of these models is their inclusion of first-level income effects of fiscal changes. This deficiency is not corrected by adding (or removing) equations.

(2) What areas on the supply side offer the most intriguing prospects for investigation and research?

By virtue of its identification of the relative price effects as the critical attributes of fiscal actions, the "supply-side" analysis clearly depends on the adequacy of the measures of the elasticity of response to the price changes induced by fiscal actions. In particular, the view now gaining increasing acceptance in the policy forum that marginal income tax rate reductions will lead promptly to increases in saving, capital formation, employment, and output depends on verification of two fundamental hypotheses. One is that the quantity of the labor services supplied will increase in response to the effect of the tax rate reduction in reducing the cost of work relative to the cost of "leisure." The other is that the amount of saving, hence capital formation, will increase in response to the effect of the tax rate decreases in reducing the real cost of future income (i.e., increasing the net-of-tax return which may be obtained per dollar of foregone current consumption). Both of these propositions are frequently disputed, primarily by those whose analytical apparatus depends on first-level income effects of fiscal changes. Thus, it is claimed by those adhering to the aggregate demand approach that the income effects of a tax rate cut are likely to offset its price effects so far as the supply of labor is concerned. This surmise, however, is based on the presumption that there is, contrary to fact, a first-level income effect of the tax rate reduction; it is, accordingly, faulty in logic. Those advancing this view often cite studies of the responsiveness of labor supply to real wage rate and real income changes; in general, the most that can be said for these studies is that they are inconclusive.

With respect to the responsiveness of saving to a reduction in its cost, critics of the "supply-side" analysis sometimes maintain that people are just as likely to reduce as to increase their saving when they can obtain any given amount of future income at a lower cost. But this view depends on the notion of target amounts of future income or wealth accumulation, a view which has no solid foundation in logic or fact.

Notwithstanding these observations, research on the question of the responsiveness of labor supply and saving to fiscal changes is likely to be highly productive. Simulations with our "supply-side" model, for example, show that the ultimate aggregate economic effects of tax changes are extremely sensitive to the elasticity of supply of labor services with respect to the real after-tax, after-government transfer wage rate. The policy implications herein should be clear.

Also of great importance is research concerning the relative price effects of government spending and regulatory policies and actions. These government activities no more than tax actions have first-level income effects. They impact on economic activity by altering relative prices. To date, very little investigation of these relative price effects has been undertaken. The returns on investment in such inquiries should be enormous.

(3) What traditional policy tools, approaches, or rules of thumb should be reassessed, modified, or even scrapped in view of new understanding of supply-side factors?

Acceptance of "supply-side" economics should materially change the basic thrust of public economic policy. A fundamental implication of the "supply-side" analysis is that there is no pay-off in focusing fiscal policy on the control of aggregate demand. A corollary conclusion is that there is no valid purpose to be served by attempting to set government spending targets by reference to the supposed contribution of these outlays to aggregate demand. Similarly, a policy focus on the total amount of tax revenues is inappropriate as a means of influencing the level or change in total economic activity. In the same connection, the size of the deficit should not be perceived as a relevant variable for policy manipulation in the interests of attaining designated levels—or rates of growth in—employment, output, income, etc.

In denying the possibility of first-level income effects of fiscal actions, the "supply-side" analysis also rejects the multiplier fiscal arithmetic as a basis for assessing the desirability of any given amount of taxes, government expenditures, or changes therein. Fiscal or budget policies predicated on the existence of a multiplicative relationship between changes in total taxes or total government out-

lays and total output and income are likely to fail of their explicit objectives—or succeed only by peradventure—and just as consequentially, are often likely to generate unintended and undesirable economic effects.

Rejection of the aggregate demand approach in favor of the "supply-side" analysis leads necessarily to a change in the appraisal of the effects of fiscal actions on the price level. In the aggregate demand analysis tax and expenditure changes generate changes in aggregate demand which, with conditions of supply unchanged by the fiscal actions, lead to increases or decreases in inflationary pressures. In contrast, the "supply-side" analysis delineates fiscal actions as impacting on aggregate demand in real terms only insofar as it first affects aggregate output by way of first-level price effects. Thus, an income tax rate reduction, by virtue of its relative price effects, generates increase in the supplies of labor and capital services and in output; increases in demand of equal magnitude are necessarily associated with the increase in output. In this analysis, accordingly, no increase in inflationary pressures results. Any such increase would have to be the consequence of an increase in the rate of expansion of the stock of money. Indeed, if the growth in the stock of money were maintained at the same rate as if the tax rate reductions were not enacted, the increase in output resulting from the tax reduction would lead to a reduction in any upward pressure on the price level.

A collateral directive for tax policy strategy which comes from adopting the "supply-side" analysis is to shift attention away from the level of tax liabilities in relation to income and toward marginal tax rates. In this connection, consider the prevailing policy concern with efforts to cancel or at least mitigate the effects of inflation on taxpayers' tax situations. The standard response of the Treasury and others opposing indexing of the tax system is that effective tax rates have been periodically reduced by discretionary tax changes, thereby cancelling the effects of inflation on real disposable income. Whether or not this is correct, it does not address the point which the "supply-side" analysis identifies as at issue: that inflation raises the real marginal rates of tax and thereby discourages work and saving. The appropriate policy question is whether the discretionary tax changes of recent years have, in fact, cancelled the effects of inflation on real marginal tax rates.

In much the same vein, as discussed earlier, the policy focus with respect to scheduled payroll tax increases should be on the consequences for the real marginal rate of tax on labor income, not on the real disposable income effect. If compensatory income tax changes are to be made, for example, these should take the form of reductions in marginal tax rates, not increases in personal exemptions, "rebates", or other tax revisions aimed at reducing the average tax liability per se.

(4) Can the government use the economics of incentives more skillfully in the future to deal with problems of productivity, inflation, and employment simultaneously instead of on an either-or basis.

One of the principal analytical outputs of the "supply-side" economics is the rejection of the so-called "Phillips-curve" relationship between inflation and unemployment. By the same taken, it rejects the view that price-level stability can be purchased only at the cost of unacceptably high levels of "unemployment" or that acceptable growth in employment depends on pursuit of fiscal and monetary policies likely to spur inflation.

On the contrary, the "supply-side" analysis shows that public policy actions which are correctly designed to remove the impediments to employment and to saving and capital formation will constrain, not enhance, inflationary pressures. The root cause of inflation—increases in the overall level of prices—always has been too fast a growth in the stock of money relative to the growth in real output. It should be obvious that with any given rate of increase in the stock of money, the more effective tax measures are in regard to increasing the supply of labor and in reducing the existing tax bias against saving and investment, the less will be the upward pressure on the price level.

The corollary is that at monetary policy which, succeeds in curbing inflation will enhance expansion of supplies of labor and capital services and total output and income. Inflation augments the existing tax bias against effort and saving by increasing the real marginal rates of income tax, thereby reducing the real after-tax returns for use of labor and capital services, hence constricting the expansion of labor and capital inputs and total output. Pursuit of a "tight" monetary policy, i.e., one which holds firmly to a steady, moderate rate of increase in the stock of money, accordingly, is not at odds with the Employment

Act goals of high rates of growth in output and employment. On the contrary, an anti-inflationary monetary policy enhances the prospects for successful pursuit of those objectives.

Another major conclusion from the application of the "supply-side" analysis to fiscal policy is that tax measures to promote higher rates of saving and capital formation are not at the expense of advancing the productivity and real wage rates of labor. On the contrary, effective implementation of these "supply-side" tax policies would enrich the capital-labor ratio, hence accelerate labor's productivity advance and increase the demand for and supply of labor services. Simulations performed with our model show that labor would get some 75–80 percent of the gain in real GNP resulting from tax changes aimed at reducing present constraints on saving and capital formation. These findings are very much in line with the conclusions of the pioneering work done by the late distinguished economist and sometime chairman of this Committee, Paul H. Douglas.

CONCLUSION

The intellectual origins of "supply-side" economics are ancient, as the calendar of economics would date it, to be found in the works of Adam Smith, J. B. Says, and Alfred Marshall, to name only a few of the titans of the discipline. Its newness is to be found only in its applications, beginning about a decade ago, to the fiscal, particularly, tax issues of contemporary American society. At this juncture, it affords a major addition to policy-makers' knowledge about how the fiscal system interacts with the economy. It offers great promise, therefore, for vastly improving public economic policies in the interests of more efficient functioning of the private market system, more rapid and solid growth in the stock of capital, steadier and stronger advances in labor's productivity, and more rapidly expanding total output and income.

APPENDIX

The Analysis of Tax Impacts Model[1]

The Analysis of Tax Impacts Model (ATIM) is based on neoclassical theory about the economic behavior of individuals and business enities. As such, relative prices are treated as major variables, entering into individual's decisions regarding the supply of their labor services and their uses of income for current consumption and for saving, i.e., the purchase of future income. Similarly, relative prices are included among the variables in business decisions regarding the amounts and composition of labor and capital services used in production activity. Tax provisions are identified in terms of their effects on these price variables; changes in tax provisions, accordingly, are identified in terms of how they alter price relationships, hence, these various individual and business decisions.

This is not to say that the model's specifications ignore or minimize income as a determinant of economic behavior. Both the labor and capital supply equations explicitly include income among their respective variables. In contrast with the standard macroeconomic models, however, tax changes are not input to the ATIM through their initial impacts on disposable income. In the real world, there can be no such aggregate impact in real terms except as a result of changes in real output, hence, changes in the amounts of productive services supplied or in the rates of their use. The initial effects of tax changes are reflected in the model as changes in pertinent relative prices—the supply prices of production inputs. The model then reflects the responses of the suppliers of these production inputs to the tax-induced changes in supply prices. As supplies of production inputs change, total output and the income claims it generates also change. These changes in real income enter importantly into the individual and business decisions delineated above.

The analytical focus of the model is on the long-term expansion path of the economy and on the effects of fiscal changes, particularly tax changes, on both the level and slope of that path. While the model presents estimates of annual changes in the amounts of various economic magnitudes in response to tax changes during the period of adjustment to a new equilibrium growth path, its focus is not on the short-term ups and downs which typify the course of the economy around a trend path through time. The model is intended, instead, to analyze and measure the effects of tax changes on the basic trends of the econ-

[1] This model was developed by Norman B. Ture, Inc., initially under a contract with the National Association of Manufacturers. Their help and the complete independence of effort on which the NAM insisted is gratefully acknowledged.

omy. The point has been widely and repeatedly made that tax policy should be concerned with its influence on these trends rather than with short-term perturbations, which are difficult to forecast with reasonable confidence. The model has the appropriate analytical focus in this respect.

Components of the model

The model consists of three main parts. The first part specifies the basic functional relationships in the economy and a number of economic identities. Together, these equations estimate the equilibrium amounts of production inputs (labor and capital services), real output, the supply prices and aggregate payments for production inputs, and total real income.

The functional relationships specified in this part of the model include—

A production function—the technical relationship between total real output and the quantities of labor and capital services, given the state of the industrial arts;

A statement of the efficiency-maximizing condition with respect to the quantities of labor and capital services to be used at their respective real supply prices;

The supply of labor service, relating aggregate annual hours of labor service to the population aged 16 and over, the real after-tax wage rate and the rate of selected government transfer payments, and total real income per person aged 16 and over; this function specifies hours per full-time equivalent employee as positively related to the real wage rate and negatively related to total income; and

The total quantity of capital people want to hold, given total income, as a function of the real after-tax return per unit of capital.

The remaining equations in this section of the model define variables in the functional relations and specify additional relationships.

The second part of the model delineates and specifies annual flows representing the composition of real output and the uses of total income. Included are equations pertaining to consumption, saving, investment, government expenditures, exports and imports, and total tax liabilities and other government revenues. Also included are a set of equations relating the general level of prices to the stock of money, its velocity, and total real output, and the overall marginal tax rates on capital and labor income, given the tax laws, to the price level.

Some of the annual flows are treated as exogenous, i.e., determined outside the model. Government expenditures, for example, are projected as extrapolations of the trend in these outlays over the period 1954–1974. For the most part, however, the annual flows are either derived directly from the equilibrium values in the first part of the model or are specified as functionally related to one or more such values. For example, gross private business investment is specified (in equilibrium) as the difference between the desired stocks of net business capital in the current and the preceding year plus the year's depreciation, including replacement. Desired stocks of capital are determined by the equilibrium equations in the first part of the model.

The third part of the model is used to analyze the tax system in terms of the marginal tax rates applicable to the income derived from various types of capital and to measure the effects of tax changes on the cost of capital. Changes in the marginal rate of tax on capital income affect the pretax rate of return required to justify acquiring or holding any amount of capital. Changes in this pretax rate of return, in turn, lead to changes in the stock of capital, resulting in changes in output, employment, real wage rates, and tax revenues.

The basic logic of this part of the model is that for people to be willing to forego a dollar of consumption in order to have more income in the future, the present value of the future income stream, net of all taxes that will be paid on it, must be at least on dollar. By the same token, for people to hold one dollars' worth of capital now, the present value of the after-tax income it produces must be at least equal to one dollar. A reduction in the marginal tax rate applicable to the income from capital obviously means that less pretax income per dollar of capital is required to satisfy this condition (the "cost of capital" is lowered.) It also means that more future income, hence, more of the capital producing it, will be desired, since it now costs less in terms of foregone current consumption.

To capture the effect of tax laws and tax changes, this part of the model specifies a number of equations (28 currently) each representing a particular type of real capital held by corporations and by individuals. In each of these equations, the left-hand side is specified as a unit of the net stock of the particular type of capital. The right-hand side shows the various positive and negative items of cash flow associated with that type of capital. Cash flow items include the gross re-

turn, depreciation and other deductions, the investment tax credit (where applicable) and various taxes applicable to the gross returns. These tax items are expressed in great detail, thereby permitting the identification and measurement of a diverse inventory of possible tax charges.

With the tax variables determined by the provisions of present law and adjusted for changes in the price level and in the growth of real GNP, this equation set is solved simultaneously to find the overall weighted marginal rate of tax on all capital income, for overall weighted gross return per dollar of capital, and the rate at which future income and expenses are discounted such that the present value of the net returns just equals the net stock of capital. The solution satisfies the condition that the after-tax return is the same per dollar of each type of capital. These values are then used in the first part of the model to find the equilibrium values of the various economic magnitudes therein under present law, and in the second part of the model, to project the year-to-year changes in annual flows associated with these present law equilibrium values.

Given a proposed tax change affecting capital, the tax variables for each type of capital immediately affected are modified to reflect the proposed change in law. Then the equations from each type of capital are simultaneously solved again to find new values for the overall marginal tax rate on capital income, gross return, and discount rate. These values are substituted for present-law values in the first part of the model to find new equilibrium values of the various economic magnitudes. Since the economy cannot make the adjustment from the old to the new equilibrium instantaneously, a five-year transition path is specified. The second part of the model is used to measure the year-to-year changes in the relevant variables during this transition period and on the new equilibrium growth path thereafter.

Finally, the differences between the values of selected variables under the tax change and those under present law are measured and presented as the major economic and revenue effects of the tax change.

Although separate sources of labor income are not specified in detail, a similar analytical procedure is followed to identify the effects of tax changes directly affecting such income. Any such tax change is identified in terms of its effect on the overall marginal rate of tax on labor income; this new value is substituted in the first part of the model to find the new equilibrium amount of labor services which will be supplied, given the amount of total income, at the new after-tax wage rate. The resulting change in the quantity of labor services is associated, in equilibrium, with changed amounts of capital inputs, real output, and real wage rates and gross return per unit of capital. The changes in total output and income also involve changes in the conditions of supply of labor services and in the desired stock of capital. As in the case of capital income tax rate changes, the new desired stock of capital along the new equilibrium growth path is attained over a five-year adjustment period.

The model generates two sets of estimates of the effects of tax changes on Federal tax revenues. The first are conventional, "initial impact" numbers which ignore the effects of tax changes on the amount of labor and capital inputs, on total output, and on total income, hence tax bases. They are included for reference purposes. The second set of revenue numbers show "net of feedback" effects. These numbers fully account for the changes in input, and income flows, for which the model solves in response to a tax change, and the effects of these tax changes on the base of each tax.

Senator BENTSEN. There are obviously some substantial differences of opinion here by distinguished and able economists as to how these econometric models work.

Let me state that I believe that there just has to be a tax cut in 1981, and I do think this is a substantial opportunity to do something about productivity in the process, and it is an opportunity that must not be lost.

My concern is that we do it at the proper time, and Congress does not work very fast on these decisions. Sometimes it takes awhile. The process of getting it through the House, then through the Senate, the conference, all of that just takes a substantial amount of time. And I frankly think we ought to be working on it, trying to see that we have done the most effective job that can possibly be done in that regard.

Now, Mr. Eckstein, I noticed in the Wall Street Journal a comment by Martin Feldstein indicating that our—he characterized our 1980 report as indicating that inflation can be reduced substantially with very modest tax reductions for investment only.

Well, we did not stop with that. On page 1 of our 1980 annual report, we suggest that the money supply growth should be reduced over a period of time. We also say on page 2, that Federal spending as a percentage of the GNP should be reduced. All of that is part of the same package and the comprehensive approach that we are talking about.

Now let me ask you about the study you did for this committee. That report does not neglect the demand side of the economy, does it?

Mr. ECKSTEIN. Certainly not. In fact, one of the main conclusions that we reached is: Unless we have a better quality of demand management, supply economics does not stand a chance.

Let me also say a word about the Feldstein comment. He is a good friend and close colleague——

Senator BENTSEN. Well, and he is a very able man. But he is so busy, he apparently has not had time to read the full report. [Laughter.]

Mr. ECKSTEIN. I do believe that the statements in the committee report and the statements in my report to you are similar in intellectual substance. Neither document claims that it is possible to eliminate the inflation by supply economics.

The possible gains that can be achieved are modest. We know it will take a long time. If we can take 1 percent of the inflation rate over 4 or 5 years, the core inflation rate, we know we have accomplished something significant. I think both documents paint a picture that, if we are correct on both scores—demand management, and not overreacting to a recession, do not pump it up with consumer purchasing power or foolish programs—that we can convert the American economy from one of 15 years of deteriorating core inflation, to one of reasonable improvement.

Senator BENTSEN. Now, Mr. Klein, you and Mr. Ture are at opposite ends of this table, and also at opposite ends of this argument, on one point, it seems to me.

You argue that changes in the tax rates had two effects on the labor supply—one serving to increase labor supply, as I understood it; and the other serving to reduce the supply.

Now, as I understood Mr. Ture, he denies the existence of the offsetting reduction.

How would you respond to that?

Mr. KLEIN. Well, you cannot start out any scientific research investigation with preconceived ideas of what is right and what is wrong. And, of course, you can define "supply-side economics" in a very narrow way and eliminate various things from consideration. But I think that is not very fruitful in the spirit of scientific inquiry.

We have many instances of worker absenteeism that are associated with the concept of what we economists have called the "backward bending supply curve" with labor, and that is an effect that shows up.

On the other hand, people are stimulated by a better rate of return.

Now the problem with ascertaining the impact of the marginal rate of taxation, or the average rate of taxation, or the whole tax system on worker incentives is that it is very subjective. Now its subjectivity does

not mean that it cannot be investigated, but it means that people cannot take off-the-top-of-the-head comments and estimates and say: Yes, people are going to work harder if they get a tax cut, or not work harder. One has to make a very serious investigation.

We will have to have sampling inquiries. We will have to go into plants. We will have to look at worker records. We will have to do this in a proper way. It is a very important issue.

Ms. Rivlin said it is probably one of the frontier issues, and we cannot give an answer today. There is an answer, probably, and we can throw some light on it; but it is a very complex question and we have to get at it in the proper way.

Senator BENTSEN. Let me pose one question to you that concerns me. When I talk about tax cuts to really encourage the modernization of productive capacity in this country, to get people to go out and buy the machinery and the equipment that we need to really compete with the Germans and the Japanese, I get some people who respond by saying: Well, yes, but you are going into a recession, and people are just not going to buy those things as you go into a recession.

How do you respond to that? What do you think about it? Any one of you.

Mr. KLEIN. Well, let me respond to that by first saying that to put the capital in place to make America more competitive would take time, and the goods stream that would come out of that, and particularly the goods stream for final consumption, would not appear for 2, or maybe 3 years in large measure; and by then, surely we will have turned the corner on the recession. So I think it would be an excellent policy to stimulate capital formation at this time.

Senator BENTSEN. Let me add——

Mr. TURE. Mr. Chairman, may I offer——

Senator BENTSEN. Let me respond to my own question, in part. I think a lot of chief executives learned a painful lesson in 1974–75 when capital spending went downhill and they did not do what they should have done in buying the new equipment, and then inflation came along and they ended up spending a lot more for it. And I really think they may have changed their attitude this time in that regard.

Mr. TURE. Let me see if I can respond to your question quite directly.

At any given level of income there is no reason to assume that the elasticity of demand for future income and the instruments that produce it—capital—is zero. If by tax actions you reduce the cost of capital, whether we are in a recession or not you are going to have a higher level of capital formation than you otherwise would have had—not because of any direct or immediate effect on aggregate demand or income, but because you are reducing the cost of buying a future income instrument.

Let me call to your attention that this committee, back in, I think, it was 1972, held a set of hearings on the value-added tax. One of the members of the committee asked: "Why do we want any more saving and capital formation? We've got excess capacity right now, as measured by one or another index of capacity utilization." He had scarcely had the words out of his mouth before everybody—including the members of this committee—were complaining about shortages.

What follows from that is that public economic policy should focus on the long term. I think that is something which all the members of this panel, and Ms. Rivlin, agree on, following your lead.

I think that is one of the most salutary and forward-looking statements in the committee's report this year: That we have, in fact, suffered, in terms of economic policy, by too much of a focus on the short run, shortrun demand management, and we should shift that focus to the long run.

Senator BENTSEN. Yes, Mr. Eckstein.

Mr. ECKSTEIN. Mr. Chairman, actually there is not even any evidence to suggest that a measure like depreciation reform or an investment credit is any less effective in a recession than in good times. Of course there is less investment at a time when business is reassessing its situation, but there is no evidence to suggest that the investment credit does not continue to play its role.

Let me also echo what Mr. Ture said. The biggest mistake that we could make with economic policy in 1980 is to focus that policy entirely on the recession. It is in the recession that you have the resources. It is in the recession that you have to set the stage for the 1980's. You have to redeploy the capital—the resources from consumption to investment, and even with the public sector from public consumption to public investment.

Mr. TURE. I think that is an excellent statement, and I am just absolutely delighted to find some occasion to associate myself with Mr. Eckstein. [Laughter.]

Senator BENTSEN. Well, I will use the line and probably not give either one of you credit for it. [Laughter.]

Congressman Brown?

Representative BROWN. You heard it here first, but not necessarily last.

I want to make a couple of points, in predicate. The Joint Economic Committee policy recommendations for the past several years have really been boiled down to threefold.

First: To fight inflation by reducing the growth of the money supply, and the administration has finally come to that with Paul Volcker doing that job. Mr. Miller never quite got around to it, I guess.

Second: Reduce Government competition for investment capital by moving toward a balanced budget. I have no illusion that we will have a balanced budget this year, given the nature of the economy, but at least the effort to reduce Federal spending and get toward a balanced budget I think is salutary. The President was born again on this issue about Easter time. [Laughter.]

Third: Stimulate the supply of productive capacity in this country by cutting taxes in ways to stimulate saving and investment. And I happen to think the President, what with the number of people we have sponsoring such legislation now in both the House and Senate, will suddenly discover this and will be struck on the road to Damascus about July on that issue.

I happen to think, however, that we are in a post-Roth-Kemp era, and I say that with all due respect and affection for my colleague on my right here—which is not easy. [Laughter.]

But I think that we now need, rather than a broad general tax cut, the concept of a tax cut that focuses into savings and investment. I therefore feel very strongly about the need for the 10–5–3 depreciation cut, and I am a little sorry that at least a couple of you focused on Roth-Kemp, because I would much prefer you to focus on H.R. 6400,

in which the three remaining members of the Joint Economic Committee here all have a paternal interest.

That is a bill that would start the tax rate on investment income back at the 14-percent rate in the lowest bracket, and go up from there as you earned more money from investment income. Frankly, I would like to cut out all of the tax on investment income, but I do not think we can get away with it because of Ms. Rivlin and others who would see that as a tax expenditure that would be too extreme. But at least if you cut the rate, you get people out of the 70-percent rate and into trying to put in more investment, rather than buying gold bricks, or oriental rugs, or something that is not made in this country—Florida land is, but it was made by God and not by the people who are working with a blue collar.

It seems to me that we have got to have that focus now, because we are in an era, or have been through an era, where people are actually dipping into savings to buy cat food—people who do not have cats—in order to survive. And the savings are being exhausted, and there is a need to restimulate savings that can be taken for investment.

Now, I would like to have you comment on that, and then I want to throw out one that I think will get you all fighting among yourselves.

Do you want to speak to that issue for me? This may get you fighting with Senator Roth, but would you speak to that issue of focusing the cut in taxes into savings and investment stimulation?

Mr. EVANS. Well, there have been a number of bills that have been introduced in the past few years—as you well know; most of them being introduced by you, I believe—to stimulate savings. One is the so-called individual savings account, which allows for an exemption of $1,500 of interest and dividend income.

Representative BROWN [presiding]. Well, let me just say, because I do not want to leave the wrong impression, that I am also a cosponsor of Roth-Kemp, but I must say that I think the best place for it on the chart was a year ago, or a couple of years ago when it was first introduced, and now we need to change our focus just a little. That I really think is the point of what I am asking.

Mr. EVANS. Well, I thank you for clarifying that. I was misled by some of your earlier comments. But I will answer your questions directly.

I think that a general, across-the-board-type tax cut is not a dead issue. I think that as far as increasing the benefits for savings, the best way to do it is to have the tax credit for those that save more than the average.

From a strictly economic point of view from a marginal analysis, that is the tax cut that supplies the greatest relief for savings.

The trouble with focusing on these bills that only increase savings—and that is obviously something that we all want to accomplish, or three-quarters of us at this table want to accomplish, at least three-quarters—I think that we have to do something about the fact that workers' incentives are going down. The fact that we do have a decline in productivity; the fact that we do have less labor offered by those who are in the labor force; I do not think we should ignore those.

Your comments about cat food was perhaps made in humor——

Representative BROWN. No; not at all. I was quite serious about it.

Mr. EVANS. I'm sorry. Well, I will treat it seriously and say that

I doubt very, very much that anybody who has to resort to eating cat food is going to save anything, regardless of what you do with tax credits.

Representative BROWN. No, I am saying they are dis-saving. They are taking money out of savings to survive.

Mr. EVANS. Yes, but basically it is an unfortunate fact of life which politicians, statesmen, and economists always have to grapple with, that most of the savings is done by the rich. It is not done by the people who have to eat cat food, one way or the other.

If you are going to stimulate savings substantially, you are going to have to give tax cuts to the rich. I do not know any other way to do it, because they are the only ones who save.

Representative BROWN. Mr. Ture is shaking his head.

Mr. TURE. Well, first let me challenge the last statement, because I do not think it is factually correct. For example, suppose you look at Statistics of Income for Individuals, the official IRS publication of data taken from individual tax returns, and try to measure the distribution of savings or the returns thereto, which is probably as close as you can get, by adjusted gross income levels. Unless things have changed enormously in the last few years—and they may have, because of bracket creep—what you would find is that fully 50 percent of the income that was reported and is identifiable as "returns on saving" is reported on returns with adjusted gross incomes of $20,000 or less. I'm sure it is about $25,000 now.

Representative BROWN. $20,000 is the median income, currently; the family income.

Mr. TURE. Well, surely it does not represent the rich.

But let me see if I could focus much more directly, Congressman Brown, on the issue that you have raised. It may be that you are perfectly right, that in terms of the optimum timing we have shifted from one tax strategy to another, all of which have the same sort of basic intent: Promoting saving, capital formation, productivity advance, and increases in employment.

I am not quite sure of that at all. If indeed that is the case, I think it is a political determination, but surely not an economic one. I do not think there is a relevant distinction to be made analytically between tax measures aimed directly, so to speak, at promoting investment in machinery and equipment—for example, 10–5–3, which I think is an enormously salutary, wholesome kind of tax proposal—and those which are a tad less direct, and which are aimed at reducing the cost of savings and capital formation for individuals. Such an example is the Roth-Kemp approach.

The Roth-Kemp approach has one little advantage going for it—it is not a little advantage; it is a substantial one—it not only has the effect of reducing the cost of saving relative to consumption; it also reduces the cost of effort relative to leisure. And that is a concern which I think all of us share.

Mr. EVANS. Before we go over to the other side of the table, just let me get one fact straight here. The people who have income under $20,000 and have savings interest and dividend income are basically the retired people who are living off their income.

It is true that it is a return on capital, but it is not likely to be changed by changes on the tax rates. Your very own bill, Congressman

Brown, to have a tax credit for those who save more than the average is still, from an economic point of view, the best way to attack this issue.

Mr. ECKSTEIN. Congressman Brown, when the real testing moment comes in a few months of what kind of tax cuts to go for, I think the Congress will have to choose between measures on the 10–5–3 type depreciation reform investment credit, and measures to encourage personal saving, or measures to generally encourage work through across-the-board personal reduction.

If you think of our national problem of competitiveness with Germany and Japan, you think of the lack of government aid for R. & D., you think of the lack of industrial capital formation, and I would urge you to give a lot of attention to the corporate kind of tax incentives.

You will get a stronger impact on modernization and productivity on competitiveness by that route than you will through the saving route. The reason is very simple. The way our economy has been organized for many, many decades, the largest part of corporate investment is financed out of corporate income, after tax.

On the other hand, the largest part of personal saving does flow into the mortgage market and housing. Our national problem is not housing; our national problem is the inadequacy of our industrial plants.

Mr. KLEIN. Well, Otto Eckstein's last comment shows the difference between the short run and the long run. We have a housing problem in the next 6 to 9 months, but we do not in the longer run; and in the longer run we do have the need for corporate plant. But I think that is tied up to the whole issue of focusing a tax revision, or a tax cut, on any particular item. What we really need, in sensible economic policy, is a well-balanced policy. We do not want to put it all in one issue or another.

In the first place, we do not know how the things are going to work out, exactly, and we had better do some spreading of risk.

In the second place, you want to keep balance in the economy. Yes, there should be incentives to save. That is a good idea for the tax system. But they should accompany incentives to invest at the same time. They go hand in hand very nicely together, and that gives good balance.

Representative BROWN. Let me just say that Ms. Rivlin in her comment that Government appropriations were more effective than tax reductions as a means of getting the economy going, makes me feel that we may have to fight over a difficult choice on this issue. That is why I raised the question I did about the focused tax cut.

My own preference would be to have Kemp-Roth, 10–5–3, and H.R. 6400—all of them: Kemp-Roth for the incentive to work; 10–5–3 for the incentive of business to invest; and H.R. 6400 for the individual to increase his savings so that the business investment would have a supply of funds to create the results.

There seems to be some—I want to conclude with one question, and I would hope you will keep your remarks brief—but there seems to be some difference of opinion as to what exactly is "supply-side economics."

For Mr. Klein, it is input/output tables. For Messrs. Eckstein and Evans, it is incentives added on to demand models, it seems to me.

For Mr. Ture, it is incentive effects alone—and perhaps Mr. Ture would not approve of such things as multipliers and backward bending supply curves.

Gentlemen, have I put my finger on the arguments between you? All of you I think have defended, or in effect embraced supply-side economics, whatever that means. But there is apparently some difference here.

Mr. TURE. I think you got your finger awfully close, but maybe not really just right on the button.

For example, there is nothing in the supply-side approach that denies the possibility of a backward bending supply curve of labor. There is something, a great deal, in the supply-side economics that says that becomes operational by virtue of a reduction in the marginal rates of tax on labor income.

I think that furthermore there is nothing in the supply-side economics that denies the importance, the primary importance of levels of income as determinants of savings and investment, and aggregate supplies of labor services.

What is at issue is whether or not those are the things that are directly and immediately impacted by fiscal actions. And I think it is the assumption in the aggregate demand approach that they are indeed, which has led to its analytical and policy mistakes.

Mr. EVANS. Well, as you well know, Congressman Brown, the thrust of theoretical supply-side economics is now going in the direction of trying to expunge the word "multiplier" from the economic vocabulary altogether. I think that is why you mentioned it that way. And that is an interesting way to go. My approach has not taken it that far.

I believe that we need to measure the effect of changes in fiscal monetary policy on productivity and on incentives. I think we need to combine that with the more traditional analysis that says: If you give people more money, they spend part of it.

The older models, in my opinion, were grossly remiss in not realizing that the savings had some important effect on the economy, and that the incentives had some important effect. But I am not willing to go the route of throwing out the demand-side analysis, because I think if we do that we then miss the interactions of the economy and we end up with the wrong conclusions, but for the opposite reasons.

Mr. ECKSTEIN. Congressman Brown, any model which claims to deal with periods as short as one generation, which ignores either demand or supply, is essentially nonsense.

Now Mr. Ture has put his finger on a major problem which I believe we have dealt with both in the traditional public finance literature, and now in the use of our models. And indeed in my testimony, I draw a very, very strong contrast between measures which are or are not offset.

To identify supply effects, you must use the method of differential incidence, which he really alluded to, to identify what the supply impact is. And you must neutralize this, he argues, the multipliers.

If you blend the two, then you get a hodgepodge and you don't know what you have. Now when Ms. Rivlin made her comment that in the short run "demand" is the factor, I think that is not the answer I would have given.

The answer I would have given is: You have to make up your mind which effects you are trying to analyze. If you are trying to analyze the longrun supply effect, you must define the offset—which may be less Government spending, or another tax increase, or what have you.

I do believe the kinds of models we have, which are not demand models, but are just simply representations of the markets of the economy—both supply and demand, if you use those models you cannot use them in the simple-minded Keynesian way that it was decades ago. You cannot simply turn it on and not think through what the offsets are and expect to find supply effects.

Mr. KLEIN. I am sure there is agreement that any sensible model has to have both supply and demand. You cannot have scissors with one blade; we learned that very early. But in addition, I think you have picked out the point of emphasis I myself would not say it is all "input/output analysis," or Norman Ture probably would not say it is all "incentive-based relationships to marginal rates of taxation," but those are what some of us might put as the core parts of supply-side economics. Everybody would agree that you need the whole bit in order to put it together.

Representative BROWN. Thank you, Mr. Klein. I appreciate the patience of my colleagues in my running overtime, but we are going to pass the chairmanship responsibilities right down the line here. You may all be here until 4 o'clock this afternoon, but I have to leave.

Senator ROTH [presiding]. Gentlemen, I will try to be rather brief, but I do want to express my appreciation to all four of you for your very helpful testimony.

My concern is, No. 1, that this is not an either/or situation.

We have in place right now additional taxes amounting to something like $2 trillion. So I do not think we have to say that we just take Roth-Kemp, or we just take capital formation, or something else.

If I understand you, what many of you are saying is that we need a tax plan, a tax strategy, not just for the next 6 months. And frankly that is what Congress and everybody is concentrating on, the November election. But we need a tax strategy for the next several years.

And I do not think, with all due respect—and I agree that probably supply side, or many of the other factors have not been proved out—but I do not think time permits us to wait. I think we have to put a tax package into effect now.

I just read in the Wall Street Journal an excellent article by Mr. Vogel, who wrote, "Japan Is Number One." He points out that if we do not make some structural changes now, that we are on the verge of being surpassed.

Now let me ask you, if I might, these three questions:

Does anyone disagree that we should begin to provide for some tax relief on the supply side now? That we should not wait?

Does anyone disagree that the balanced budget—or not the balanced budget, because it will be unbalanced before long—does anyone disagree that the current budget does nothing about productivity, for all practical purposes?

Mr. KLEIN. Well, there was one point that Ms. Rivlin mentioned. I think this budget pays more attention to R. & D. expenditures, especially associated with the military; and to the support of basic re-

search than previous budgets. And that will turn out to be an important ingredient. It does not do a huge measure, but it does it in a noticeable way.

Senator ROTH. Yes, Mr. Ture.

Mr. TURE. Senator, I put it a little differently. I think this budget is an antiproductivity advance. It is an incremental deterrent to advancing productivity. The marginal aggregate tax rate in this budget for 1981 is something—for the Federal Government alone—is something well over 30 percent. And it is all going to come off "at the margin" as a deterrent to saving, investment, and personal effort. Just as wrong as it could be.

Mr. EVANS. In addition, I think we have to look at the President's plan to have a withholding tax on the interest and dividends. It just a harassment of the saver, and I think that will diminish saving. The President claims he would like to increase savings, but this works in the opposite way.

Senator ROTH. Mr. Eckstein, did you want to comment?

Mr. ECKSTEIN. This budget is not aimed at productivity.

Senator ROTH. It's not what?

Mr. ECKSTEIN. The 1981 budget was not aimed at the development of productivity. The 1981 budget was the old medicine of slowing down an economy that was moving too fast, period.

Senator ROTH. I agree with that, and I think it is the wrong medicine.

Let me ask you this question: I would like to point out to you, Mr. Evans, that the Roth-Kemp bill does have written into it spending restraints. For some reason, that is not well understood. And the Roth-Armstrong bill really was the first year of the Roth-Kemp legislation.

But I gather that at least three of the four of you feel that across-the-board cuts in the marginal tax rates with some kind of spending restraint is in the interest of productivity and growth. Would you agree with that, Mr. Ture?

Mr. TURE. It is not just "in the interest." I think in terms of what policy tools there are for the Congress to deal with, it is essential. You do not have all that many options. The one that you do have, and it is very much in your hands, is tax policy and spending policy as well. And if you forgo that opportunity this year when you have everything going for you, I think it would be an absolute catastrophe. It would set back public economic policy I do not know how many generations.

Senator ROTH. Mr. Evans?

Mr. EVANS. You stated that the Roth-Kemp bill had spending restraints built into it. There have been several versions of it.

Senator ROTH. Basically, two; but the current version does have a 21-percent ceiling on spending in 1981.

Mr. EVANS. The more recent versions do, the Roth-Kemp. What most people call "Roth-Kemp II," last year which I testified on also had them built in. I think the original Roth-Kemp bill is widely perceived not to have these restraints built in. It has caused some confusion, and I think that the "Kemp" part of Roth-Kemp is addressed to the tax cuts more than the spending cut side.

Senator ROTH. Mr. Eckstein, I am sorry I missed your testimony, but I understand that you talked about a 10-percent tax cut, but it was not zeroing in on the cut in the marginal tax rates.

Mr. ECKSTEIN. Well, if you want to return the economy to some kind of normal development in the 1980's, you have to have some kind of general personal tax reduction, just to offset the tremendous increase; no question.

Senator ROTH. Is there any reason not to do that now; to put it into place now?

Mr. ECKSTEIN. We need the tax cut by January 1981, given the increases that are legislated for that date. And I suppose it is none too early to devise the proposal.

Senator ROTH. Mr. Klein.

Mr. KLEIN. I would much prefer to see targeted tax cuts. I agree that the tax cuts are needed. There are many recipes. The best recipe in my opinion would be tax cuts that stimulate capital formation and rollback of the social security increases that are statutory from January 1, 1981. Other kinds of targeted tax cuts may be better. There are many of these, and we have to look for the best one. But I think an across-the-board tax cut is not as good for productivity.

Senator ROTH. I might point out, on social security, I proposed in the Finance Committee that we take some of the extra corporate taxes which the oil companies would be paying and use that to offset the social security, and lost by a vote of 10 to 10.

Well, I would just make one final observation and then I will turn it over to my colleague. I think it is fine to zero in on some of these capital formation proposals, but I think the American public rightfully expects some tax relief. I think if we are going to develop a long-term program that the American working people are going to support, they are going to have to see that they are involved in it.

It is all very well to talk about 10–5–3 and some of the other things which Business Week did, and they do nothing for the public, but you are not going to have the political underpinning that I think is essential.

Mr. ECKSTEIN. Senator Roth, I developed that set of issues in my testimony, which I did not read. I would also like to request that you enter in the record the statement as I actually wrote it, not as I very loosely summarized it.

Senator ROTH. We have done that for all you gentlemen. Again, I thank you very much for your help.

I will move the chairmanship over. [Laughter.]

Representative ROUSSELOT [presiding]. Gee, I don't know how to act. [Laughter.] Thank you gentlemen for being here. We do appreciate the time you have taken in presenting very complete statements, probably more than we have been able to indicate. We hope that it gets widespread distribution among our colleagues, because I think it is very much needed.

We are often told on the Ways and Means Committee on which I serve in the House, that tax cuts are very inflationary. Mr. Ture's supply-side analysis, and I quote, "shows that public policy actions which are correctly designed to remove the impediments to employment and to saving and capital formation will constrain not enhance inflationary pressures."

"The root cause of inflation," he goes on to say, "increases in the overall level of prices, is that there always has been too fast a growth in the stock of money relative to the growth in real output."

Do the other three gentlemen agree with that?

Mr. KLEIN. No.

Representative ROUSSELOT. Do the other two agree with that?

Mr. EVANS. Part of it.

Representative ROUSSELOT. Part of it? Well, you can condition it any way you want.

Mr. ECKSTEIN. Congressman Rousselot, the inflation was also caused by excessive Government spending——

Representative ROUSSELOT. Yes, some of us understand that.

Mr. ECKSTEIN [continuing]. During the Vietnam war, which cannot be offset automatically by controlling the money supply, and, of course, there is OPEC and all that.

Representative ROUSSELOT. But as a general statement, do you agree with Mr. True's statement I just quoted?

Mr. ECKSTEIN. With the elaborate qualifications I have added.

Representative ROUSSELOT. Thank you.

Mr. Klein?

Mr. KLEIN. No; he is entitled to a monetarist point of view; this is a country of free speech. But I do not think it is a sound statement.

Representative ROUSSELOT. Can you disprove it?

Mr. KLEIN. Yes, but not in 2 minutes.

Representative ROUSSELOT. No; I don't mean in 2 minutes. Would you be willing to submit something to me on that? Well, I have a lot of questions, but I understand I am supposed to go to the floor and participate in a rule debate, so I apologize.

Since I am all that is left, does any one of you want to comment further?

Mr. Ture?

Mr. TURE. I think that part of the response to some of the observations in my testimony was the implication that the supply-side analysis, as I have delineated it, ignores demand in the analysis. It does not.

Changes in the composition and level of demand are absolutely an inherent part of that analytical framework. The way in which the supply-side analysis differs from the aggregate demand analysis is: It insists that fiscal actions cannot impulse changes in the economy by changing disposable income; that they can impulse changes in supplies, and of goods and services and demands for them, only by first changing one or more relative prices.

That is the singular distinction between the two analytical frameworks. And I think the implications in terms of policy—policy devices and the design of policy—are just enormous.

Representative ROUSSELOT. Let me ask a question now that has been suggested relative to this chart here to my right [indicating]. A DRI study done for the Joint Economic Committee showed a significant jump in the U.S. growth rate from accelerated depreciation. That one small change would take us about one-quarter of the way from the U.S. growth rate of 3.5 percent over the last 30 years, toward the German growth rate of about 4.5 to 5 percent. Look at what the results would have been.

What other steps could we take to close the gap?

Mr. KLEIN. Well, certainly worker training, structural problems in connection with the labor force, and much more attention to R. & D. and basic research. There are a whole host of things that could be done to improve productivity.

Representative ROUSSELOT. If any of you want to respond additionally in writing to this question, that would be fine. I do not want to cut you off. Did you have an additional comment?

Mr. KLEIN. Yes; another look at the effect of the regulations on productivity. And I am sure there are some inroads that have been made by the regulatory mechanism that could be corrected.

Representative ROUSSELOT. Mr. Eckstein?

Mr. ECKSTEIN. I think Mr. Klein's list was near exhaustive. I do not believe that we can achieve the Japanese rate of growth. The Germans have faded back toward our rate, unfortunately, although with less inflation. But there is no doubt that if we want even just to recapture the kind of productivity performance that we've been accustomed to for the last century, that we are going to have to move in all of these dimensions that Mr. Klein suggests.

Representative ROUSSELOT. Thank you.

Mr. Evans?

Mr. EVANS. Well, the major factors of the decline in productivity from 3 percent during the first 20 years of the postwar period to zero percent now are basically the decline in the investment ratio, the increased cost of government regulation, the relatively higher price of energy, and the reduction in proportion of resources devoted to R. & D.

So I think we have to hit on all those burners. Certainly the single major factor has been the decline in the investment ratio. That can be adjusted by tax policies which we have discussed here this morning.

Now as far as the cost of government regulation, many of these other countries are working toward stricter standards, but they are not doing it in the ham-handed fashion that we are in this country, where the Government basically not only tells business what has to be accomplished, but usually suggests the most expensive way to do that.

I think that instead of business and government being enemies, as they are in this country, if we would try to all pull in the same direction I think this would have a substantial effect. This is more political than economic, but it is still very important.

As far as the other two factors, we are all facing higher prices of energy. This country has done virtually nothing in terms of a comprehensive energy policy, except to make it more expensive to produce domestic oil, and subsidize the sheiks. I am not in favor of that policy, by the way.

As far as R. & D. spending, again this has been mentioned several times.

The capital gains tax cut was a major step in this direction, and further steps of that sort are needed.

Representative ROUSSELOT. Mr. Ture?

Mr. TURE. I think there are an enormous number of things that probably can be done to advance that rate of growth in the U.S. economy. One thing that has not been mentioned—and it is very difficult to attack rigorously—is we have to do something about the work ethic, and restoring it.

But I think the single most important clue for public policy is, as has been suggested, increasing the rate of growth in the capital/labor ratio. It is the decline in the growth rate which is, I think, primarily responsible for our very sorry performance over much of the last decade. We have got to reverse that. There is an enormous inventory of fiscal changes that would be useful for that purpose, several of which have been talked about today.

I would say that certainly 10–5–3, not just so much for what it will do in terms of accelerating capital recovery, but in terms of getting us off of this chase of a will-o'-the-wisp called "useful life" and "real economic depreciation," which does not exist, would be—to repeat—an enormously constructive measure. So would the Roth-Kemp, and similar proposals.

Representative ROUSSELOT. Thank you, gentlemen. We appreciate very much your being here. You have given us some good answers. Thank you.

If anyone wishes to submit additional comments in writing, please feel free to do so.

Thank you, all. The committee stands adjourned.

[Whereupon, at 12:47 p.m., the committee adjourned, subject to the call of the Chair.]

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